SCIENCE AND INDUSTRY
See Lib
Route to | See page
1
2
3
4
5
6
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AUG 14 1950

1920—Thirty Years of Service to Construction—1950

Contractors and Engineers Monthly

Vol. 47, No. 8 AUGUST, 1950 $3 a Year, 50 Cents a Copy

Covering the Field

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AUG 14

● Meetings We Attended

WASHO conferees spoke hopefully of more unity among U. S. road builders—page 1.

Roadside-development men discussed year-round seeding and other problems—page 14.

● Causeway Is Rebuilt

Three firms built 5 bridges and 3½ miles of roadway across the famed Marshes of Glynn, as reported on page 5.

● Bituminous Paving

Aggregate so scarce on a road-mix job, page 10, that it was dredged from a river.

Page 17, a contractor reminisces out of his experience with sand and soil mixes.

Local "agg" and a portable asphalt plant cut hot-mix costs for Maine—page 57.

● Power Plant and Store

Ground water plagued excavation for a power plant along the Ohio River—page 21.

Surcharged ground troubled excavation for a Houston department store—page 62.

● Aggregate Production

The crushing-screening setup starred on page 26 really spewed out tonnages for 20 miles of flexible base and hot-mix.

● County Road Work

Mechanize for economical rural-road maintenance is the suggestion on page 29.

A hefty equipment fleet helps plenty in a county's fight to maintain oiled mats against soggy subgrades, floods. Page 98.

● Bridge Built, Bridge Rebuilt

Michigan built a new one to carry its Jackson By-Pass. Page 33.

Cuyahoga County, Ohio, rebuilt the deck of an old one. Welding helped. Page 67.

● Three Sewer Contracts

Water complicated all three pipe-laying jobs but was conquered by wellpoint systems and sheeting. Page 36 tells how.

● Delta-Mendota Canal

High yardage from draglines and tractors and record-breaking by slip-form liners put the canal ahead 32 miles. Pages 40-41.

● Sand Drains—Grading

Sand drains and sand fill help turn a marsh into a New Jersey highway, page 46.

Realignment turns a "murder hollow" into a safe Vermont highway, page 103.

● Levee and Floodwall

Which went where to protect an Ohio River town depended on space available along the shore line. See page 53.

● Expressway Through Dallas

And it runs right through the city, too, on an old RR right-of-way. Page 74.

● Runway Costs Shaved

How? By a gravel-cement base laid by spreaders, topped with bituminous concrete. One pugmill for both mixes. Page 80.

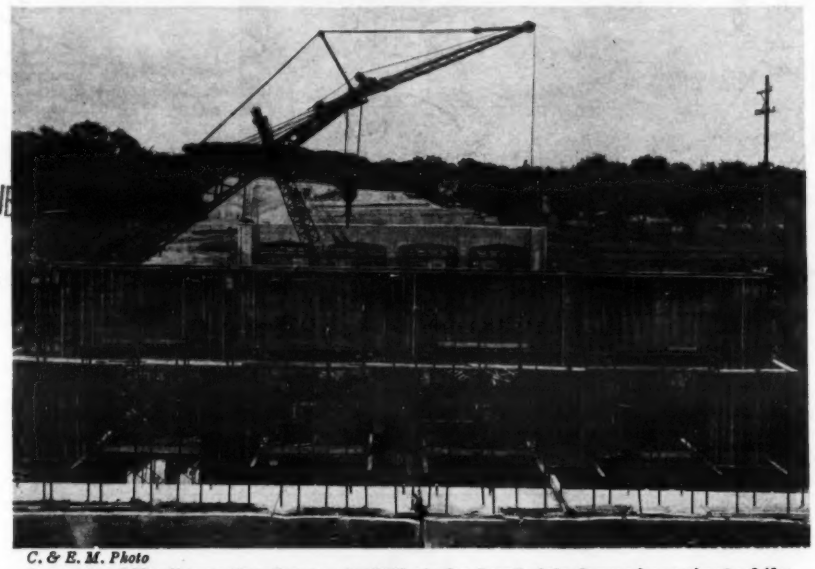
● Earth Dam in Headwaters

An RC conduit was built too, in open cut through ledge rock. See page 85.

● Concrete Paving

Ten inches for 10 miles to reclaim a 30-year-old narrow road—page 89.

(You will find "In This Issue" on page 4)



C. & E. M. Photo

A couple of Manitowoc Speedcranes backfill at pier 2 and strip forms from pier 1 of the new vehicular bridge to carry the Jackson, Michigan, North Belt By-Pass over railroad tracks and the Grand River. Page 33 covers the Jutton-Kelly Co. contract.

C. & E. M. Photo

M. DeMatteo is building an earth dam here at West Peterborough, N.H., to check floods on a tributary of the Merrimack River. On the far side, the conduit gatehouse goes up. Nearer us, a Euclid bottom-dumps a load which a D8 will level off. See page 85.

Victor M. Helm Photo

The structural-steel frame of Sakowitz Bros.' new store rises against a background of Houston buildings. Unusual basement walls mark Tellepsen's job reported on page 62.

Unity Plea Made At WASHO Parley

Truck-Loading Excesses and Disagreement on Federal Aid Must Stop, Say Speakers

✦ UNITY among highway officials, cooperation between engineers and highway users—U. S. road building could stand more of both.

That was the conclusion reached by 375 delegates in the somber red-velvet-decorated Public Auditorium of Washoe County's Library Building in Reno, Nev., as the Western Association of State Highway Officials met for its 29th Annual Conference.

It was apparent to all, when the substance of key remarks was added up, that the day when highway departments were an entity is almost over. Cooperation, unity, better construction, better public relations: they were urged again and again.

Governor Pittman Speaks

Hon. Vail Pittman, Governor of Nevada and Chairman of the Board of Directors of the State Highway Commission, started the ball rolling by urging western engineers to resist the pressure for low-cost roads.

"Higher-type highways, equal in every respect to national standards, must be built if present traffic is to be served," he said.

Governor Pittman also urged that existing unimproved links on major transcontinental routes be improved by new construction, using special supplemental funds if necessary.

Hale Looks Ahead

Hal H. Hale, Executive Secretary of AASHO, interpreted what he called "the handwriting on the wall" for the highway industry. Mentioning the "house divided" within the parent association, Hale called for a united front in thought and action if the national highway program is to advance. The old saying, "If we do not hang together we shall hang separately" was apropos, he said.

The pressure from all sides for secondary-road construction is placing the primary system in jeopardy, Hale asserted, pointing out that the national highway maintenance bill is expected to jump to $1,500,000,000 in the next 4 years.

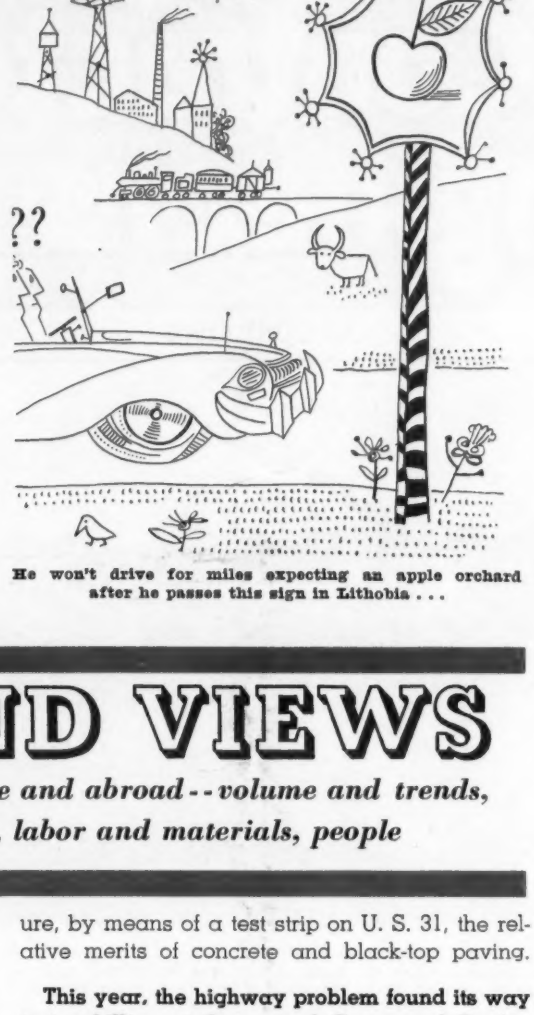
"Dispersion of funds to secondary highways is the greatest threat of all to the trucking industry," said Hale, as he termed "demagogic" the current political appeal for hard-surfaced tertiary roads to every door.

"Wolves are chewing at your heels," Hale told the westerners as he pleaded for unity in the ranks of highway engineers in the matter of Federal Aid.

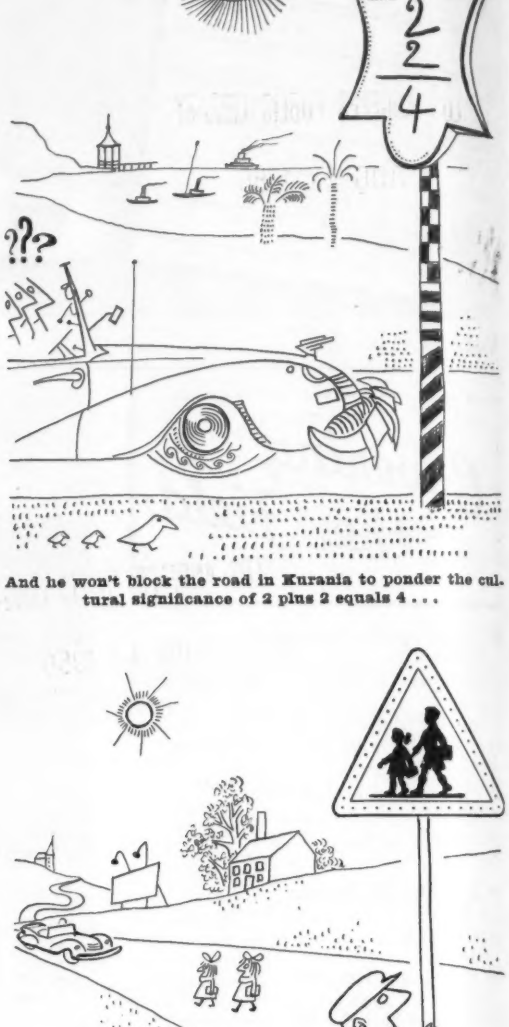
Hale told how pressure was likely to be exerted for all-Federal control on

(Continued on page 100)

Some day soon when Mr. Smith goes motoring abroad, he won't have to face this bewildering array of road signs.



He won't drive for miles expecting an apple orchard after he passes this sign in Lithobia . . .



And he won't block the road in Kurania to ponder the cultural significance of 2 plus 2 equals 4 . . .

NEWS AND VIEWS

of the construction industry at home and abroad--volume and trends, state and Federal legislation, labor and materials, people

As we recall, our concluding words on this page in June were offhand ones about 1950 "as the year the toll road took in America". It now appears that the toll road may take us specifically, the New York staff of C&E Monthly! **An elevated toll expressway is proposed, which would cross Manhattan "in the vicinity of 30th Street".** Now we too are in its vicinity—between 31st and 32nd Streets, to be precise—and thereby hangs this tale of conjectures. Should the perverse plan materialize, we may face the alternatives of betaking ourselves to a new address or of staying put through all the bedlam of midtown construction and betaking ourselves thereafter to the nearest sanitarium. In either case, we would be "took". The irony of it all has been something of a tonic during these blistering summer days.

Manhattan, while we're on the subject, has "nearly reached its capacity to absorb traffic". Had we who work here been making the traffic origin and destination study, that qualifying "nearly" would have been omitted, but the Port of New York Authority is possibly more scrupulous than we. In any event, expressways to carry traffic around the island or over it offer the only hope of relief, according to the study. New Hudson crossings would be involved within the next decade, too, if Manhattan is to handle the 13 or 15 million more vehicles a year expected for her—God forbid!

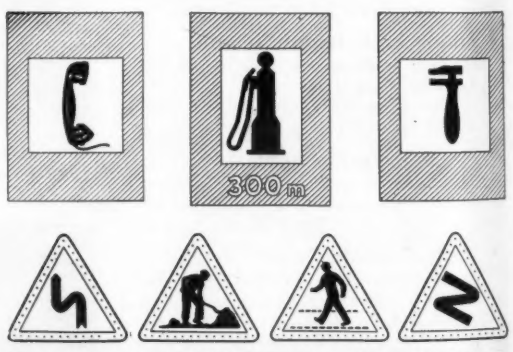
As we write, **eight trucks are trundling day and night over four test sections of concrete pavement** south of Washington, D. C., in what is known as Road Test One-MD. Two pairs are single-axle trucks loaded to 18,000 and 22,400 pounds, two pairs are tandem-axle trucks loaded to 32,000 and 44,800. Each pair operates on a different section of the road. Researchers will record stresses and strains that appear in the slabs and underlying soils to determine what loads, speeds, and axle arrangements distress the road most. The HRB is administering the test with the cooperation of the BPR. Several states are financing it. Seven manufacturers are lending the test trucks. The petroleum industry is supplying gasoline, oil, and grease . . . **Indiana, too, has a research project up her sleeve.** She will attempt to measure, by means of a test strip on U. S. 31, the relative merits of concrete and black-top paving.

This year, the highway problem found its way to top billing at the annual Governors' Conference. By adopting a 184-page staff report of the Council of State Governments, the governors committed themselves to work for a comprehensive highway safety program, for vehicle size and weight restrictions, and for a thorough study of the highway tax structure. (Incidentally, 44 state legislatures will be in session during 1951.) With traffic fatalities in the nation already up 11 per cent over 1949 (see page 15), **the governors' move toward leadership in safety is particularly opportune.** And if they had any doubts about the value of their leadership, BPR Commissioner MacDonald reassured them at the conference that the "key to productive action" in the field of safety is in the authority of each governor in his own state.

While Commissioner MacDonald was spurring on the governors at one conference in June, Assistant GSA Administrator Follin was briefing building officials at another. Almost no Federal buildings are going up at present, he said, but advance planning and blueprinting are in full swing so that a **sizable public building program could be launched at once should private building slacken.** Congress authorized $40 million for site acquisition and planning last session and appropriated $12 million to get it under way. The program covers 575 projects and would involve construction costs of about $350 million. The actual requirements for Federal buildings have been estimated at $6 billion, said Mr. Follin, and their eventual construction "could offer an important bulwark to the country should economic conditions deteriorate".

They aren't deteriorating at the moment, if the demand for structural steel is a dependable symptom. At a meeting of southern steel fabricators, President Patterson of the American Institute of Steel Construction noted a **sharp upturn in the structural-steel business,** which began in early March and has continued. "Statistics show the country in a great wave of prosperity",

For apple and 'rithmetic will both give way to a picture sign that means in any language "School Ahead".



Here are some more of the picture road signs the United Nations Conference on Road and Motor Transport recently adopted, along with a new world code of the road.

Drawings by Sternberg, Courtesy of United Nations

Patterson said, adding thoughtfully, "Yet I seldom find anything like the optimism of the late 1920's, when we were in the boom before the bust."

Ninety-four out of 100 contractors, according to an AGC survey, find building construction volume good or excellent . . . 90 out of 100 say the same for heavy construction . . . 75 out of 100 see highway construction that way. Manpower and material shortages have appeared in some communities, and wage rates and material prices have risen in recent months. But one effect of that rugged competition we mentioned in April has been to hold down the owner's construction costs while increasing the general contractor's.

Hits Federal Policy On Water Resources

In a sharply worded report, an 80-man committee of the Engineers Joint Council has condemned as "excessive and unsound" the Government's practices with respect to our water resources. The report, submitted July 1 to President Truman and his Water Resources Policy Commission, deplored "ambiguous, uncoordinated, and conflicting" Federal policies concerning power, irrigation, flood-control, and navigation projects. It attributed the situation to competing Federal agencies and Congressional "response to pressure and trading". It urged that an impartial board of engineers be created to analyze and appraise Federal water projects before they are authorized by Congress or the money for them is appropriated.

The report held that a number of inland waterways projects in existence today are completely devoid of justification. It criticized the fact that many immediate beneficiaries pay little or nothing toward the costs of projects, while general taxpayers bear more and more of the costs. It charged that the billion-dollar Missouri Basin development was authorized by Congress in haste and without appropriate public hearings within the Basin, and that many of the authorizations in the recent Rivers and Harbors Act were for undertakings which are neither desirable nor warranted. It argued that claims of benefits in terms of "national welfare", "national defense", and "the general good" should be explicitly identified and considered separately. And it stated that the development of water resources should, wherever feasible, be by local enterprise — governmental or private.

The report also recommended that Federal water projects be authorized solely by Congress, and that there should be no further authorization until a uniform national policy has been adopted; that projects should be self-supporting as far as possible; that authorizations should serve as an absolute limit on appropriations and should not be in blanket form; that Congress should review any substantial change in a project and that the authorization should become void if the project cost overruns by 20 per cent the cost estimated; that adequate time should be allowed for collecting essential data and determining whether or not there is real need for a proposed development; that expenditures should be at a lower rate during general prosperity and at a greater rate during periods of reduced business activity and employment; that benefits should be expressed in average annual monetary terms and strictly compared with average annual costs.

ASTM Standards, 1949

The 1949 "Book of ASTM Standards" is now practically completed. The 8,000-page edition contains over 1,550 widely used specifications, tests, and definitions of the American Society for Testing Materials, and will be published in six parts or volumes.

Part 1 deals with ferrous metals; part 2 with non-ferrous metals; part 3 with concrete, cement, ceramics, thermal insulation, road and waterproofing materials, and soils; part 4 with paint, naval stores, wood, adhesives, shipping containers, and paper; part 5 with textiles, soap, fuels, petroleum, aromatic hydrocarbons, and water; and part 6 with electrical insulation, plastics, and rubber.

Each part of the book has a detailed subject index and two tables of contents. A supplement to each part will be issued late in 1950. A complete Index of Standards comes with the 1949 book at no additional cost. Parts 1, 5, and 6 are available for $10.00 each and parts 2, 3, and 4 for $8.00 each. A complete set costs $54.00. Copies may be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

AASHO Contest Winners

Winners of the 1950 National Essay Contest of the American Association of State Highway Officials have been announced. In the Junior Division, in which junior civil-engineering students prepared essays on "Why Civil Engineering Students Should Take Highway Electives", Frank Martin Naglich, Wayne University, Detroit, was the winner. Honorable mentions went to David T. Ricker, University of Connecticut; Glenn Nordmark, South Dakota State College; and Arthur A. Carter, Jr., Tufts College.

Among the senior engineering students who prepared essays on "Highways in Our National Economy", Jack Hamner Dillard of the University of Virginia was the winner. Honorable mentions went to Lloyd G. Bird, Ohio State University; Harold C. Jeppsen, Purdue University; and Rex Allender, Iowa State College.

Gurley President Dies

Charles I. Day, President of W. & L. E. Gurley, Troy, N. Y., maker of surveying and scientific instruments, died on June 22 after a long illness. He had been associated with Gurley since 1919, serving as General Manager and later as President and a director.

The resilience of this Texaco Asphaltic Concrete pavement is an important reason for its durability under the heavy traffic of this Massachusetts street.

To cope with the increased volume and weight of today's traffic, a pavement needs every advantage engineers can give it.

One of the most important qualities a pavement can possess today is resilience, the ability to absorb impact. The heavier the impact, the more essential resilience becomes, if a pavement is to give lasting performance with minimum maintenance.

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TEXACO ASPHALT

Contractors and Engineers Monthly

A NATIONAL BUSINESS PAPER
For the Highway and Heavy-Construction Industry

Issued Monthly by Buttenheim-Dix Publishing Corp.
Editorial and Business Office: 470 Fourth Ave., New York 16, N. Y.

Acceptance under the Act of June 5, 1934, at Mount Morris, Illinois, authorized March 26, 1945.

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Daily News Bldg., Chicago 6, Ill. — Duncan A. Scott & Co., Mills Bldg., San Francisco 4, Calif. — 2223 Ben Lomond Drive, Los Angeles 27, Calif. — 1010 Equitable Bldg., Portland, Oreg.

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"Unity" at What Price?

Ever since the North Atlantic segment of AASHO dared last spring to suggest a limit to the Federal government's financial share in the building of highways, there has been a growing clamor among officials for "unity". That states might raise money, plan roads, and build them under state steam has caused increasing apoplexy among spokesmen for the AASHO. In June the thought floated into Reno, Nev., and appeared at the western conference of highway officials.

Gingerly, without reducing the idea to so many words, it has been implied that the North Atlantic is the splinter party. Its members are the renegades and rascals. "Unity" has been defined by inference as a common stand for even greater road-building participation by the U. S. government.

In the name of heaven why?

Federal Aid has helped to standardize highway design and has pooled public money more or less efficiently. It has generally coordinated the road network. But it will be forever a debatable question whether the states would not eventually have cooperated with one another and done the job as well or better, and at less cost. Federal Aid is one solution to highway finance, but there must be a limit to its scope if 48 state highway departments are to preserve their identity, individuality, and freedom of action.

To justify their continued existence, state highway departments must somehow tackle their local responsibilities. They must raise their own money, make surveys, prepare designs, let contracts, maintain roads, and set the proper example so cities and counties will follow. These things must be done to the fullest. The states which pioneer in this direction may win universal acclaim for their moral courage.

It will be harder to do in sparsely settled states; that is certain. But if even these states do not meet their responsibility with vigor soon, the demise of state highway departments as we know them is easy to foretell. If they do not measure up, why should the public underwrite them?

The undertones to that question are all too plain in the current suggestion in Washington, D. C., that work on the Interstate System be all-Federal: Federal design, Federal supervision, Federal contracts. There is doubt that the states can or will proceed rapidly enough, and the implication is, without evidence, that the Federal government could do it faster.

And there are other signs. Federal politicians in Congress are recommending an all-weather road to every farm and hamlet. It will get votes. It can be built only at the expense of the primary system, according to reputable engineers. There is a possibility that the primary system will be ruined through lack of maintenance, if highway engineers grease the skids so that politicians can deal with only one agency instead of 48 separate and individualistic state highway departments.

It just could be that the North Atlantic segment considered these aspects in an ever-changing picture, and reached a clear and accurate conclusion. Despite all implications to the contrary, "unity" could mean that the men from the North Atlantic Association of State Highway Officials are on the beam, and it is their courage and policies the rest of the country could do well to imitate.

One Building—One Contract

On page 62 is an example of the reason why any sizable building should be constructed under one contract, by one prime contractor, if the owner is to get it finished on time at reasonable cost.

For years this fundamental thought was never questioned, but now the picture is changing. One of the current headaches for owners, architects, and general contractors is a demand by specialty firms that they be recognized by individual contracts.

What they want will not work in practice. Because of jealously guarded jurisdictional skills, a modern building is usually put together by a team of specialty subcontractors, working with one prime contractor. Any team needs a captain if its effort is to count to advantage. Could the Allied armies have stormed successfully into Germany if the timing of each unit had not been directed by General Eisenhower's one command? Exactly the same sort of timing is at stake when a group of contractors work together on a building.

Consider the case on page 62. Here was a prime contractor, Tellepsen Construction Co., hurrying to finish a building the owner needed if he was to open in time for Christmas buying. Assisting Tellepsen were 22 subcontractors and suppliers of material. By the time the job was finished there may have been more.

How fast would the store have been built if 22 firms had been running over each other, each with a separate contract? The confusion is all too easy to visualize. The foundation firm might have delayed the excavating contractor. The structural-steel erector might have had to build his own timber ramp down into the basement. Bricklayers might have interfered with contractors on other phases.

As a matter of fact, the owner did make private arrangements for electrical fixtures, outside the jurisdiction of the architect and the general contractor. The confusion was all too plain. Concrete pours were delayed or guessed at pending arrival of electrical items. The precise timing of many parts of the job was ruined.

Specialty firms should realize that their demand is the poorest possible solution to a complex problem. For construction costs must be lowered, not raised, if volume is to hold. The confusion on a job where 22 separate contractors tried to work without coherent leadership would run prices so high that the incentive for owners to build new structures would soon diminish. Venture capital must be stimulated, not suppressed, if America's free-enterprise system is to survive.

General building contractors and specialty firms should start to work immediately to correct the inequities which make the specialty firms want their independence. It calls for a little more Golden Rule and a little less business rule. Superintendents should make every effort to see that specialty firms are not delayed when they are called to the job. The spirit of free and open competition which general contractors preach might well be extended a bit more enthusiastically to all competent specialty firms.

That is the only way to treat the problem rather than its symptoms.

Construction of a modern million-dollar building should serve the public and produce a profitable business return for all concerned. It is no accident that building contractors choose their best, most seasoned superintendents to call the signals on these important jobs. The owner or architect is rare indeed who is as competent a building captain as a seasoned, tough superintendent of the prime contracting firm.

Doubtless there is room for improvement in business relations between general contractors and their specialty subfirms. This improvement should be initiated at once, and while it is, the move toward independent contracts should be resisted by every contractor, owner, and architect.

Love Those Laurels, Houston; New Orleans Is Challenging Them

To the Editors,
CONTRACTORS AND ENGINEERS MONTHLY:

When are you going to print an article on New Orleans' building boom? I have just read your article on Houston's [June, 1950, page 31] and think New Orleans has been slighted. Why New Orleans, at the present time, is in the midst of a boom that is greater than Houston will ever see. More than twelve multistory buildings are either being constructed now or are on their way.

Just to name a few: There is the 17-story Claiborne Towers apartment building, which is one of the largest buildings of its kind, taking up a whole square block. Then there is the 20-story office-store-hotel building and parking garage next to the Roosevelt Hotel, which should be started in a few months. The Union Station project is in full swing, and 17 overpasses and underpasses are being constructed, with completion of the whole project scheduled for January, 1952. A 10-story California Oil Co. office building is nearly completed. Work has started on the multimillion-dollar V. A. hospital. A $35,000,000 bridge across the Mississippi is in the planning stage, as is the $10,000,000 tunnel under the Industrial Canal. A causeway across Lake Pontchartrain is planned and will definitely be built. Several expressways will be built. A $35,000,000 housing project will start in a few months also. These are only a few of the projects planned or being built.

There would be nothing that I would like better than to open the pages of your magazine and find an article on New Orleans. I am a civil-engineering student at Tulane and naturally enjoy the material covered in your magazine. But why not an article on the building boom here, and let thousands read about it?

Thanking you for taking time to read this letter, I am

Earl George, Jr.
Tulane University
New Orleans, Louisiana

In This Issue

Aggregate Production	26
Airports	80
Bituminous Paving	10, 17, 57, 80
Book Review	59
Bridges	5, 33, 67
Building Construction	21, 62, 102
Canal Construction	40, 41
Causeway Construction	5
Concrete Paving	89
Convention Calendar	79
County Road Work	29, 67, 98
Dam Construction	85
Distributor Doings	71
Dredging	5, 46
Editorials	4
Expressway	74
Flood Control	53, 85
Grading	46, 103
Highway Maintenance	19, 57, 59, 98
Legal Decisions	105
Letters to the Editors	4
Levee Construction	53
Meeting Reports	1, 14
News and Views	2
Portrait in Print	93
Power Plant Construction	21
Road Stabilization	17, 26
Roadside Development	14
Sand Drains	46
Sewer Construction	36
Water Resources	3
Welding	67

A County Engineer Views His Profession

To the Editors,
CONTRACTORS AND ENGINEERS MONTHLY:

The article in the May, 1950, issue on page 35 titled "Better Engineering Needed in Counties" was very interesting to me. From that article I assume that most county engineers in the great state of Montana are elected rather than appointed. That, gentlemen, does not appeal to me at all.

It is my humble opinion that the County Engineer's office should not be a political one. Many capable and outstanding engineers could be dismal failures when it came to vote getting; consequently, I believe the office should be appointive and filled by a qualified registered professional engineer, who would be assured that his job is safe regardless of the political changes that may take place in the County Commissioner's office.

When county governmental bodies insist upon their county engineer being a qualified registered professional engineer with the ability to plan, organize, and execute the many duties of the office, then and only then will they receive the type of work so essential to local government.

Your article mentioned salaries. I am of the opinion that the minimum salary for a qualified registered professional engineer should be the figure mentioned in your article—$4,200.00 per year. Periodic increases should be provided as an incentive to the qualified engineer to stay on the job. Knowing that his efforts are appreciated, he will gladly give of his time and knowledge and endeavor to make his county the best engineered county in the state.

A capable engineer is an asset to any community.

Very truly yours,
Malcolm M. Steele
Johnson County Engineer
Olathe, Kansas

Causeway Reconstructed Across Marshes of Glynn

Dredge Pumps Hydraulic Fill To Widen Roadway; Five New Bridges Are Included In Georgia Contract

✦ THE County of Glynn and the City of Brunswick, Ga., are reconstructing the 25-year-old causeway across the marshes of Glynn that connects Brunswick on the mainland and St. Simons, one of the fabled sea islands of coastal Georgia. The 4.3-mile project includes 3.5 miles of roadway and 5 bridges with a total length of 4,235 feet. Work on the rebuilding of the causeway, a toll road, got under way in April, 1949, and is scheduled for completion this summer at an estimated cost of $2,300,000.

Three contracting firms, under a joint venture, are engaged in the construction. The Atlantic Dredging Co. of Satsuma, Fla., pumped hydraulic fill used in widening the roadway. The Seaboard Construction Co. graded this fill; arranged the detours necessary to maintain traffic during the construction; laid a new black-top pavement; and moved palm trees from the old alignment. The Tidewater Construction Corp. of Norfolk, Va., built the 5 new bridges, and is the prime contractor for all work.

The original causeway, built in 1925, was in need of rehabilitation. The 18-foot bituminous pavement was too narrow to accommodate present-day heavy traffic going back and forth between the mainland and the popular island resort. The timber bridges were also in a state of disrepair so that traffic had to crawl over them and maintenance costs were high. On the rebuilt causeway, the new bituminous pavement is 20 feet wide on a lime-rock stabilized base, while the new bridges, of reinforced concrete, have 24-foot roadways.

Reinforced-Concrete Bridges

From the mainland east to the island, the marshes are cut through by several streams of varying size, 5 of which require major bridge structures. The first, over Terry Creek, is 325 feet long. Next comes a 927-foot lift bridge over Back River, followed by a 469-foot span at Little River. Farther east is Mackay River with a 1,225-foot crossing, and finally the widest of them all, Frederica River, which flows past the western side of St. Simons Island as part of the great Inland Waterway. It is bridged by a 1,287-foot structure which contains a lift span. The two lift spans have 100-foot horizontal clearances and 85-foot clear vertical heights.

These reinforced-concrete bridges consist of 6-pile bents on 36-foot spans, supporting caps on which rest precast girders and slabs. The design live load is H15-44, while the design vertical load for the concrete piles is 50 tons, and 62½ tons for both vertical and horizontal loads. For lengths under 65 feet, 16-inch-square piles suffice. When the piles are required to be over 65 feet, the cross section is increased to 18 inches. The outside piles in the 6-pile bents are battered, while the inside piles are plumb.

Across the tops of the piles go caps, 3 feet wide x 2½ feet deep, which support 4 concrete girders 15 inches wide. On top of the girders go the precast slabs for the 7-inch deck, which has a 2-inch parabolic crown. Along both sides are handrails, 2 feet high. The caps and handrail were cast in place from a floating concrete plant, while the piles, girders, and deck slabs were all cast in the bridge contractor's yard in Brunswick, towed to the site, and set in place by floating crane rigs.

Casting Yard

The Tidewater Construction Co. set up its concrete casting yard in the west end of Brunswick on the banks of the east branch of the Turtle River. Concrete materials were batched from an aggregate bin and cement silo and mixed in a highway paver. A Wiley 50-ton Whirley crane on gantry rails picked up the precast members and loaded them onto barges. These were towed to the job site from 4 to 7 miles away, depending on the location of the bridge to which they were assigned.

C. & E. M. Photo
The dredge Clark Hill pumps hydraulic roadway fill for the new causeway across the marshes of Glynn to St. Simons Island in Georgia. Here her spuds are at the right.

Among the pieces of floating equipment in service on the bridge construction was another Wiley 50-ton Whirley crane mounted on a steel barge. This unit drove the piles and also set in place the precast-concrete pieces. Vulcan hammers drove the piles—a No. 1 for the 16-inch size and a No. 0 for the 18-inchers.

The new bridges are located slightly to the north of the original spans in order to maintain traffic during the construction. At the movable spans the new

(Continued on next page)

Cost conscious?

Here's the champ cost-cutter!

THIS IS IT—Goodyear's SURE-GRIP tire—the tire that's the overwhelming favorite of economy-minded construction men because it cuts over-all hauling costs. SURE-GRIP is tops for drive-wheel traction on graders and pans because it was specifically designed to deliver maximum performance on these specific jobs.

Goodyear's got the winning team of special-purpose tires

HARD ROCK LUG
Super-tough champ for all types of rock work

ALL-WEATHER
Finest for flotation, rolling big loads faster

Here are two more great tires for construction work, each the outstanding favorite in its class because each is specially engineered to help you move more *yardage* faster *and* cheaper.

Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

Causeway Is Rebuilt Over Glynn Marshes

(*Continued from preceding page*)

alignment is far enough away so as not to interfere with the swing of the old drawbridges.

Roadway Cross Section

On the roadway, however, the center lines of the old and new alignments vary little. In maintaining traffic, a new roadway was built immediately south of the original one by skimming some material from the top of the old road and moving it out beyond the slope line. The new causeway is built over the old one, but a foot higher and also wider. The necessary material for the larger embankment came from hydraulic fill, but over most of the job this could not be pumped directly on the roadbed because of the traffic. Instead it was stockpiled and built up later in lifts with earth-moving equipment.

Some muck, too, was removed from roadway areas, particularly at the bridge heads for the new abutments. This was done by dredging, and the muck was replaced with sand in the same way, the hydraulic fills taking a 10 to 1 slope. The borrow areas that supplied the sand for dredging were at least 1,000 feet both ways off the causeway center line.

The new roadway is 40 feet wide. It includes a 20-foot single bituminous surface treatment with liquid seal on a 22-foot lime-rock stabilized base 6 inches thick. The pavement has a 2-inch parabolic crown, and from the edges of the seal 10-foot shoulders slope away ¾ inch to the foot. The subgrade for a depth of 12 inches was stabilized to a bearing value of 50 psi by incorporating clay-gravel obtained from the original roadbed.

Dredging

The initial work on the project was done by the Atlantic Dredging Co. with its 12-inch diesel-driven dredge Clark Hill. This craft was built in 1947 for work on the Clark Hill Dam project, near Augusta, Ga., and from there was shifted to the Santee River near Georgetown, S. C., and thence to the present job. (See C. & E. M., August, 1947, pg. 21.) Its steel hull is built of 4 pontoons and measures 70 x 24 x 6 feet deep. A 25-foot A-frame at the bow, tied back to an 18-foot gallows frame, supports a 35-foot ladder at the end of which is a 5-blade 36-inch-diameter cutter head. At the stern are 18-inch-diameter spuds, 36 feet long, built of steel plate and each weighing 3 tons; they are held in place by a 26-foot-high gantry frame, and are inside the hull.

The main engine is a Superior 350-hp 8-cylinder diesel that operates the dredge pump immediately forward on a direct drive. The pump, manufactured by the Georgia Iron Works, has a 14-inch intake and a 12-inch discharge, with a 3-vane 39-inch impeller. On this job the vacuum averaged 15 inches, and the discharge pressure was around 60 pounds. Forward of the pump is a Caterpillar D7700 diesel driving a Fairbanks-Morse 55-kw dc generator which runs the Westinghouse 50-hp cutterhead motor. Closer to the bow is another Caterpillar diesel engine, a 4400 unit, which runs an American 5-drum hoist on the swing gear. The center drum raises the ladder; the two drums in line out to the sides handle the ¾-inch swing line; the two drums right behind these are for the spuds.

Bros and Tampco rollers pulled by Fordson and International tractors compact the lime-rock base of the new Georgia Causeway. The subgrade is stabilized with clay-gravel from the original roadbed.

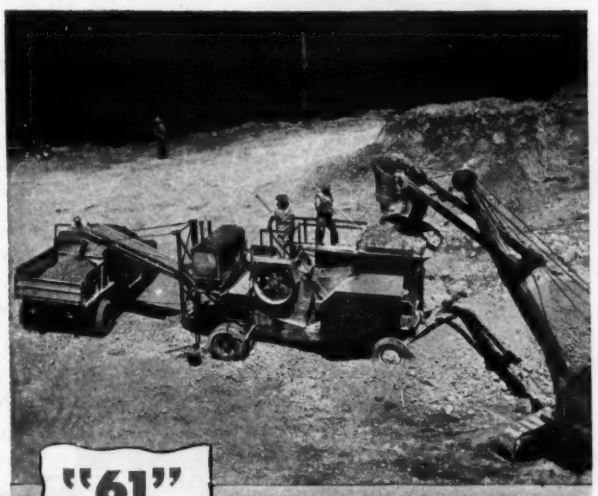
The Clark Hill can dig to a 28-foot depth, but on this job seldom went down 10 feet below low water. It averaged about 140 feet on the swing line which was anchored to deadmen off to the sides. The major change on the dredge since it was built was the addition of a 12-inch Georgia Iron Works booster pump having a 3-vane 28-inch impeller. The booster is set up on the port deck near the stern, and is driven by a belt from a booster engine located amidships at the stern. The engine is a Caterpillar D7700 diesel.

Increases Production

The booster pump was installed on the dredge to increase production from the 3,000 to 5,000 yards it averaged over a 24-hour period with just the main pump, to a new high daily average of 6,000 to 7,000 yards. The pump and the booster turn at speeds of 400 rpm. From the cutter head, which has a 24 rpm, the 14-inch intake line enters the

(*Concluded on next page*)

MAKING LITTLE ONES OUT OF BIG ONES



"61"

Designed for fast, economical production where extreme accuracy in grading to size is not required. Compact, lightweight and readily portable. Simple design and sturdy construction keep operating and maintenance costs at a minimum.

The AUSTIN-WESTERN LINE includes Jaw Crushers and Roll Crushers in a wide range of sizes; plus matching screens, elevators, conveyors and bins. Exclusive features increase output, assure constant operation and reduce maintenance costs. Skilled engineering characterizes each and every Austin-Western crushing, screening and washing plant, which is tailor-made to a particular production problem. We would welcome the opportunity to discuss yours.

AUSTIN-WESTERN COMPANY
Aurora, Illinois, U.S.A.

"201"

You'll like its READY PORTABILITY . . . CHOICE OF FEED . . . HIGH OUTPUT. The "201" is of a size and weight that can be transported over most highways without a special permit . . .

may be had with either shovel-loading hopper, or swivel drive for separate feed conveyor . . . is capable of producing especially large amounts of ¼" and smaller product.

BUILDERS OF ROAD MACHINERY SINCE 1859
Austin Western

ONE MAN GANG
GOLDAK model 87
Featherweight
PIPE LOCATOR

Only the Goldak Model 87 offers all these BIG features:
MICROTUNING
PENTODE TUBES
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Streng. positive location signal.
Standard miniature radio tubes and flashlight batteries.
Exact location of buried pipes, mains, gates, tees, etc. Total weight, 11 lbs. — one man operation! Lasts a lifetime — guaranteed performance.

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GLENDALE 1, CALIFORNIA

dredge hull through a flexible rubber sleeve on a straight suction to the pump. The 12-inch discharge leaves the top of the pump on the port side, gains the deck on a 48-degree angle, and passes through the booster on the way back to the stern.

It leaves the dredge for the pontoon line through flexible rubber sleeves. The floating 12-inch pipe comes in 40-foot lengths with rubber sleeve connections. Each section of pipe is supported by two oval-shaped cylinders, 14 feet long x 42 inches wide x 30 inches deep; the pipe is welded into saddles shaped in the cylinders. On top runs a catwalk, 20 inches wide, made of two 2 x 10's held to the pipe by saddle blocks. The land line comes in 15-foot lengths, and has slip-joint connections. The average length of discharge line on this job was around 3,600 feet, both pontoon and land, but it has extended out to 5,000 feet.

Auxiliary floating equipment included the tug B. B. Sanders, 26 x 7 x 3 feet deep, powered by a Caterpillar 3400 diesel marine engine. A 14 x 22-foot pontoon welding barge accompanied the dredge; it was equipped with a Westinghouse 400-amp welding machine. The dredge was fueled from the causeway by Standard Oil tank trucks from Brunswick. It carries 4,200 gallons of diesel fuel and 200 gallons of lube oil in the hold. In addition the dredge has alongside a 10,000-gallon tank that carries 5,000 gallons and still gets flotation.

The Clark Hill worked three shifts a day, 6 days a week, on the causeway construction, with a total crew of 25. A single shift during the day of the land crew usually sufficed for setting shore pipe.

Quantities and Personnel

The major items in the construction of the 5 bridges included the following:

Furnish and drive piles, 16 and 18-inch	43,876 lin. ft.
Structural steel	826,000 lbs.
Treated-timber piles	8,940 lin. ft.
Class A concrete slabs and girders	4,845 cu. yds.
Class Y concrete caps and rail	1,864 cu. yds.
Reinforcing steel	1,470,000 lbs.
Metal bearing plates	51,000 lbs.

The major items in the dredging and roadway work included the following:

Muck excavation	105,100 cu. yds.
Hydraulic embankment	263,700 cu. yds.
Embankment, Class 1	69,070 cu. yds.
Compacted subgrade material, 12-inch	86,160 sq. yds.
Lime-rock stabilizing material	5,830 tons
Processing base stablizing material	48,483 sq. yds.
Bituminous prime	16,210 gals.
Single bituminous surface treatment	44,106 sq. yds.
Liquid seal	44,106 sq. yds.
Planting palm trees	217

The reconstruction of the Brunswick-St. Simons Causeway, roadway and bridges, was designed by Sverdrup & Parcel, Inc., Consulting Engineers, St. Louis, Mo. The same firm also supervised the construction contracts, with Richard Hilleary as the Resident Engineer.

For the Tidewater Construction Co., builder of the bridges, J. R. Liles was Superintendent. The Atlantic Dredging Co. work was in charge of James McKenzie, Superintendent. H. J. Friedman, President of the Seaboard Construction Co., personally looked after the roadway and paving features of the contract that were handled by his firm, with W. E. Goff as Superintendent.

Traffic-Line Marker

A new self-propelled large-capacity traffic-line marker has recently been developed by the Gledhill Road Machinery Co., of Galion, Ohio. Designed for tractor mounting and two-man operation, it will provide markings 3 to 8 inches wide in a solid or broken pattern. It is equipped with standard paint guns, tanks, valves, gages, and air compressor. Its patented adjustable bead dispensers are designed to give uniform distribution.

The overall width of the machine is 5 feet 6 inches. This permits traffic to pass on either side without interruption. The tractor is equipped with a governor to insure constant speed at all times and under all road conditions. Specially designed paint guards control the width of the traffic line. The guards are suspended to provide a clean line edge and uniform paint distribution.

Gledhill's new traffic-line marker will paint stripes 3 to 8 inches wide in solid or broken pattern. It is narrow enough to permit traffic to pass on both sides.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 156.

Aluminum-Alloy Scaffolds

Literature describing aluminum-alloy scaffolds for many construction and maintenance jobs can be secured from Up-Right Scaffolds, Inc., 1013 Pardee St., Berkeley 10, Calif. It includes complete directions for erecting the scaffolds and data on their dimensions.

Each leg of the unit has a 24-inch adjustment to provide a solid and level scaffold on uneven ground or floor surfaces. A locking collar and an expanding nut make it possible to slide the threaded leg for instant adjustment. The folder highlights this feature and the corrosion resistance and light weight of aluminum alloys. It includes price lists of all equipment and parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 66.

A SURE BOND OF PROTECTION for Concrete Jobs

Republic's Diamond ◇ Design Concrete Reinforcing Bars

...are designed to exceed requirements of the first standard specification covering concrete bar deformations—"Minimum Requirements for the Deformations of Deformed Steel Bars for Concrete Reinforcement"—ASTM Specification A-305-49 adopted June, 1949.

Lugs or deformations are higher and more closely spaced than before—without change in standard foot weights—see table below.

This means better bonding properties, better anchorage in concrete than ever before—possible savings in steel, in bending, in installation.

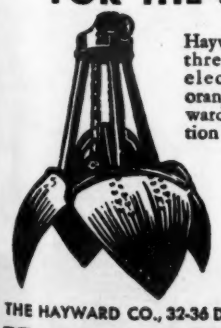
Made from new billet steel only, these bars are rolled at Cleveland, Buffalo, South Chicago and Gadsden. Write for further details.

REPUBLIC STEEL CORPORATION GENERAL OFFICES—CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

Size Number	Cross-Sectional Area, sq. in.	Nominal Diameter, in.	Foot Weight, lbs.
3	0.11	0.375	.376
4	0.20	0.500	.668
5	0.31	0.625	1.043
6	0.44	0.750	1.502
7	0.60	0.875	2.044
8	0.79	1.000	2.670
9	1.00	1.128	3.400
10	1.27	1.270	4.303
11	1.56	1.410	5.313

REPUBLIC STEEL
Republic
CONCRETE REINFORCING BARS

USE RIGHT BUCKET FOR THE JOB



Hayward makes all three—clamshell, electric motor, orange peel. A Hayward recommendation is unbiased.

—HAYCO—

THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

Here is the 6B902 motor-driven cement-flow table with the guard removed.

Motor-Driven Table Tests Cement Flows

A new 10-inch-diameter motor-driven flow table for testing the flow (consistency) of portland cement has been developed by American Instrument Co., Inc., 8030 Georgia Ave., Silver Spring, Md. It is designed to meet the June, 1949, specifications of the ASTM.

The complete apparatus consists essentially of a 10-inch-diameter flow table, motor drive, and bracket for mounting on a concrete pedestal. The motor drive and its mounting bracket may be obtained separately for attachment to manually operated flow tables already in use, if such tables meet ASTM specifications, the company says.

The motor drive transmits motion to the shaft of the flow table by means of a multi-jaw coupling which compensates for minor misalignment in set-up and provides a positive, torsionless drive. The unit can be adjusted vertically and laterally to align the drive shaft with the table shaft. The table shaft and cam revolve at 108 rpm, which results in 25 drops of the table in about 14 seconds. If the motor switch is pulled immediately after the twenty-fifth drop, the mechanism will stop before making another drop. Means are provided for obtaining the desired ½ or ⅛-inch drop of the table.

Further information may be secured from the company by requesting Bulletin No. 2177. Or use the Request Card at page 16. Circle No. 134.

New High-Speed Rod

A new mild-steel E6012 electrode, Fleetweld 72, is being introduced by the Lincoln Electric Co. of Cleveland 1, Ohio. It is designed for high-speed production of single-pass fillet and lap welds in flat or horizontal positions. It comes in 14 and 18-inch lengths, and in ⅛, 5/32, 3/16, 7/32, ¼, and 5/16-inch-diameter sizes for operation on both ac and dc.

It operates best, without overheating, at currents above those normally used with E6012 electrodes. With higher melt-off rates, greater welding speeds are obtained in depositing dense high-strength ductile welds, Lincoln says. Arc characteristics secure good root penetration; the nearly flat bead eliminates piling up of excess weld metal; the smooth-flowing arc deposits welds with a minimum of spatter, even at high amperages; and the slag is practically self-cleaning, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 2.

Promotions for B&D

Some personnel shifts have been made recently in The Black & Decker Mfg. Co., Towson, Md., manufacturer of portable electric tools. Robert A. Brown has been upped from Service Engineer at the Cincinnati factory service station to Sales Engineer in the Atlanta branch, where he will work with distributors in northern Georgia and eastern Tennessee. George H. Thalman, Jr., has taken over Brown's duties in Cincinnati. William F. Dunn, Jr., formerly Service Engineer at the New Orleans branch, is now Sales Engineer there. Grady R. Funk, Service Engineer at Charlotte, was transferred to fill Dunn's former position. Robert Dawson has become a Sales Engineer at the Kansas City branch. He will live in Omaha and cover Nebraska and western South Dakota.

Hoists and Dump Bodies

A 6-page broadside about Hercules medium-duty hoists and dump bodies has been prepared by the Hercules Steel Products Corp., Galion, Ohio. It describes the Models K, KD, KDL, and 100 CD hoists and stresses the Model D-12 dump bodies.

The catalog points out that the Center-Lift principle of the hoists is designed to keep the lifting point well ahead of the center of the load, permitting smooth hoist operation with minimum oil pressure. The hoists are designed for use with standard medium-duty dump bodies from 7 to 8 feet in length, and for long-wheelbase chassis with 9 and 10-foot bodies. Cutaway photographs illustrate the operating features of the Hercules pump, balance piston valves, and hoist mechanism.

The broadside also illustrates and describes five dump bodies for construction work, including the regular contractors' dump bodies, rub rail bodies with removable sides and those with hinged sides.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 26.

Oil for Heavy-Duty Engines

A circular on the new D-A diesel oil is now available from D-A Lubricant Co., Inc., 1311 W. 29th St., Indianapolis, Ind. It tells how and why D-A diesel oil reduces engine deposits and neutralizes destructive combustion-chamber acids. It also discusses the problems recently encountered with the appearance of fuels with a high-sulfur content.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 109.

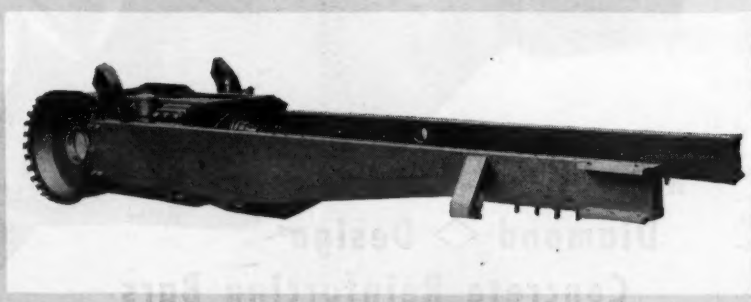
WHERE PROFITS TA

"CAT" EQUIPMENT SPEAKS YOUR LA

To THE earthmoving contractor profits are mighty important. And an outfit like the one shown on opposite page offers more ways of *boosting* profits than any comparable equipment under the sun. These are not imaginary or "iffy" profits. They're the kind that show up unmistakably—in lower costs per yard, in more yardage per hour, and in more lifetime hours per machine.

Take the "Caterpillar" DW10—one of the greatest wheel tractor successes in recent years. Look at the work-capacity features and the honest-to-goodness quality "Caterpillar" has built into it. (Nothing is too trivial in making "Caterpillar" products the finest and most profitable investments of their kind.) See your "Caterpillar" dealer for further facts and figures about DW10 advantages for your job.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



Profit IN STRENGTH

The DW10 is built to handle big loads. Main frame—composed of two strong box welded members securely fastened to transmission case—is 12 inches deep at the rear, where the load is carried. The rigid structures have several times the resistance to twisting strains that channel sections of the same size afford. Great frame strength and ruggedness provide a firm foundation for the components of this powerful wheel tractor.

Profit IN QUALITY

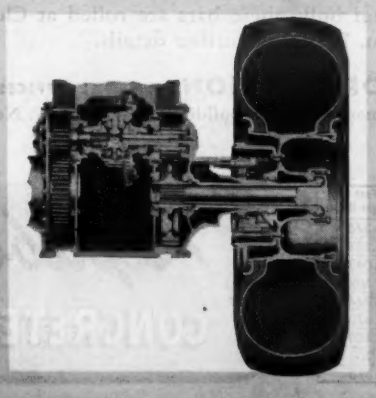
To withstand the demands of continuous hard work, the final drive assembly of the DW10 is rugged yet finely engineered. It embodies precision-built bevel gears, full floating rear axle, crown-shaved "Hi-Electro" hardened final drive gears, optional gear ratios, welded steel transmission case, cast steel final drive housing, air-operated brakes. Sound construction!

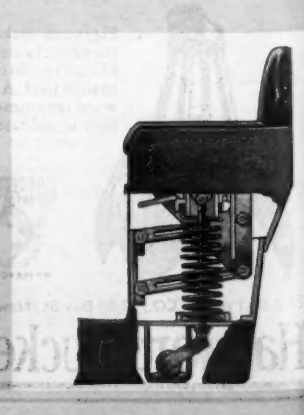
Profit IN EASE OF OPERATION

A hydraulic booster gives the DW10 passenger-car steering ease and absorbs shock loads when taking rutted roads and downhill runs. Yet the steering system can be operated independently of the booster feature. A fine safety feature in the highest sense!

Profit IN OPERATOR COMFORT

The DW10 is built for easy, safe driving. Besides finger-tip steering, excellent visibility, handy controls, and minimum "stretch," the DW10 provides easy riding through airfoam rubber seat cushion plus seat springs that are adjustable to operator's weight.





The Importance of Timing For Multiple-Hole Blasting

A 20-page booklet prepared by the Atlas Powder Co., 904 Market St., Wilmington 99, Del., discusses the importance of timing for multiple-hole blasting. It explains in some detail the Rockmaster 16 blasting system for quarry work, road construction, strip mining, and tunneling. It points out that the Rockmaster system permits timing a blast in thousandths of a second.

This system is designed for all types of dynamite shooting involving more than one drill hole. By means of Rockmaster electric detonators, holes are fired with a split-second delay interval. Time lags between individual firing depends upon the formation, the amount of throw desired, necessity for vibration control, and other factors. The detonators are available in 17 different timings, ranging from instantaneous to 550-millisecond delay. The booklet explains the Rockmaster basic system, its features, and its applications under a variety of operating conditions.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 42.

Bituminous Mixing Plant

A broadside describing the B-G maintenance plant, a combined drier and mixing unit, is offered by the Barber-Greene Co., Aurora, Ill. The plant is designed for maintenance and repair work, small road-paving projects, and many surfacing jobs requiring capacities of up to 35 tons per hour. Portable and easily erected, it consists of two basic units: a No. 840 mixer and a No. 830 aggregate drier or a No. 839 drier; each has a towing hitch and pneumatic tires. A cross-section drawing shows job-site installation and operation of the plant.

The folder explains that the auxiliary equipment needed depends upon operating conditions and the type of mix required. A reciprocating-feeder housing and bulkhead plate, two-compartment bin, asphalt transfer pump, and dust collector are described briefly and illustrated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 106.

The new Cleco SC3 scaler operating in close quarters on a bridge.

Air Operated Scaler; Three Cutting Heads

The new SC3 air-operated Triple Scaler manufactured by the Cleco Division of the Reed Roller Bit Co., P. O. Box 2119, Houston 1, Texas, is designed to speed the cleaning of bridges, tanks, pipes, structural steel, barge hulls, and castings. Because it can be used with or without a dead handle and with a center-inlet or end-inlet throttle, it provides four variations in operating procedure. The company recommends the center-inlet throttle location for flat surfaces and the end-inlet throttle for corners, deep channels, and other close quarters.

The ⅞-inch-diameter pistons are integral with the scaling points; and this, coupled with valveless operation, sharply reduces maintenance cost, according to the manufacturer. Tool exhaust is directed at the surface being cleaned.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 12.

Improved Tire Chain

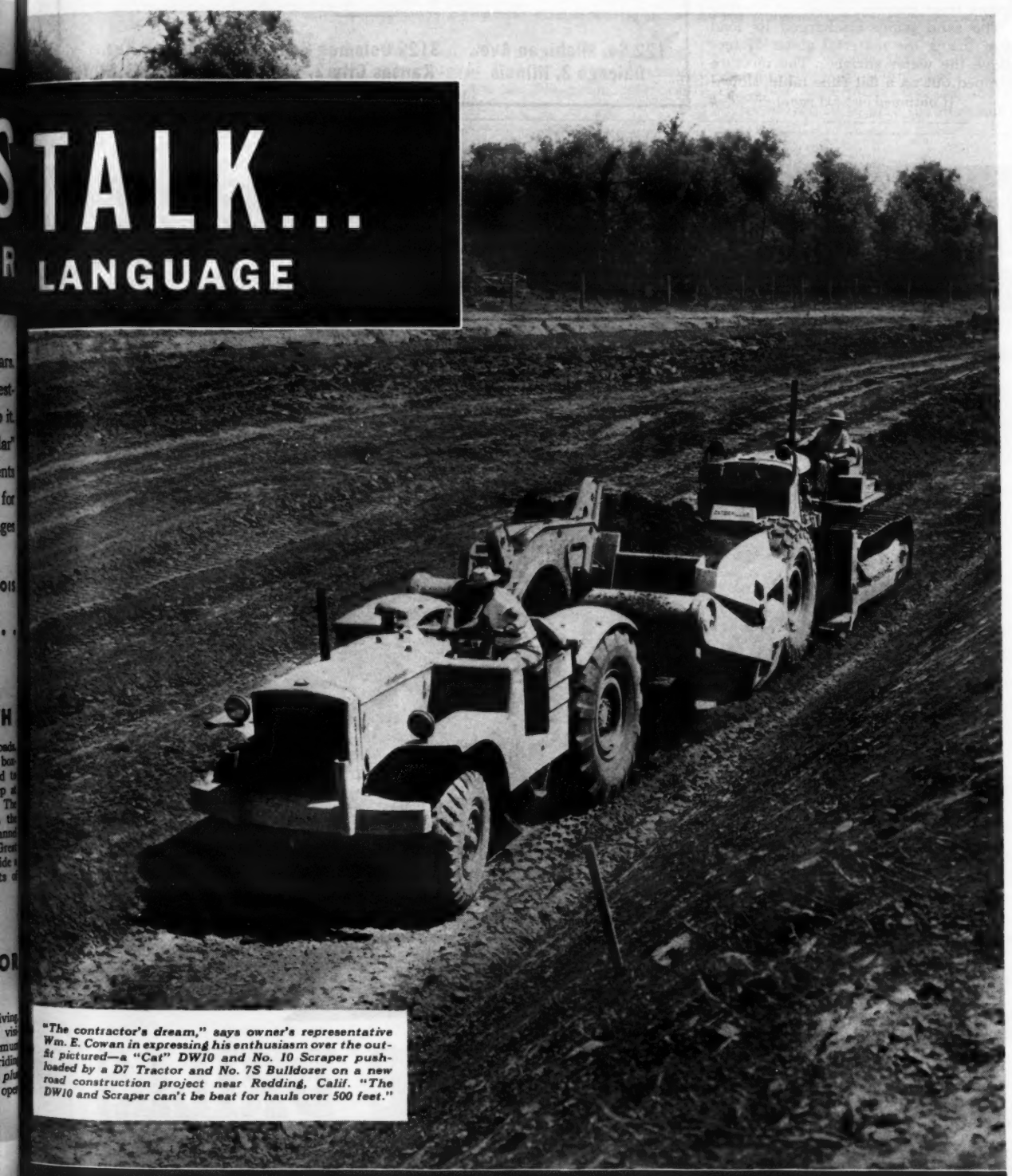
A tire chain has been designed by The Cleveland Chain & Mfg. Co., 545 Henry St., Cleveland, Ohio, to increase chain and tire life, reduce running noise, and cut link breakage to a minimum. Straight-shank connecting links are used between cross chains and side chains. These differ from conventional "pinch type" connecting links in that they hold cross chains at a constant 90-degree angle in relation to side chains. This prevents chain slack and excessive tire wear when brakes are applied, the company says; it also eliminates slippage of connecting links along side-chain links, and reduces vibration and noise.

Chains with the new straight connecting link are said to fit tight against tire surfaces, due to the even application of connecting-link tension along the entire surface of each side-chain link to which it is attached. Another feature cited is the ease with which connecting links can be removed from side chains. Wide spacing of straight-shank link-hook ends permits the easy insertion of repair tools.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 93.

Pipe Men Elect Officers

New officers for 1950-51 were elected at a regular meeting of the Board of Directors of the National Clay Pipe Manufacturers, Inc., in Chicago during June. W. E. Robinson, President of The Robinson Clay Product Co., of Akron, was elected President of NCPMI. D. M. Strickland, management consultant of Cincinnati, was elected Vice President. And John D. Cook, Chicago, Ill., was elected Secretary-Treasurer. This is the sixth consecutive term for Strickland and Cook.



"The contractor's dream," says owner's representative Wm. E. Cowan in expressing his enthusiasm over the outfit pictured—a "Cat" DW10 and No. 10 Scraper push-loaded by a D7 Tractor and No. 7S Bulldozer on a new road construction project near Redding, Calif. "The DW10 and Scraper can't be beat for hauls over 500 feet."

CATERPILLAR
REG. U.S. PAT. OFF.
DIESEL ENGINES · TRACTORS
MOTOR GRADERS · EARTHMOVING EQUIPMENT

SEE the NEW MOVIE FILM of "CAT" DW10s in ACTION
at your dealer's. A full-color picture packed with interest and convincing profit-making performance.

Bituminous Deck Improves Highway

Aggregates Hard to Find For Road-Mix; Republican River Is Dredged to Get Everything but Filler

✦ THE shortage of road-building aggregates has always been particularly bad in southwest Nebraska. The situation was never better illustrated than it is between Arapahoe and Atlanta, on U. S. 6. Here the Hastings, Nebr., contracting firm of M. M. Lippincott recently modernized 7.8 miles of the old oiled highway.

Mineral aggregate for the new 4-inch upper deck of road-mix was so scarce that the material was dredged out of the Republican River 5 miles from the job. Even so, the per cent of coarse gravel which met the specifications was pitifully small. The sand pump worked sometimes for hours to fill the 30-yard plant bin.

Known as Project F-431 (3), Lippincott's road-building assignment cost the Nebraska Department of Roads and Irrigation $110,000. Started June 27, 1949, with 75 working days to go, the project ran into overtime because of the materials difficulty.

Lippincott's work consisted of about $2,400 worth of force-account patching on the old pavement, priming the surface, and placing two 2-inch layers of bituminous road-mixed material. The base course is 26 feet wide, and the upper surface mat is 24 feet.

A "Typical" Resurface

This project exemplifies to a remarkable degree the bituminous mixed-in-place construction which Nebraska is now using in many places to modernize her highway system. Highway 6 is a fast interstate route, which carries almost as much traffic as U. S. 30 farther to the north. Bituminous secondary roads in the immediate vicinity let the contractor detour the traffic around the work.

Both the base and surface courses consist of a blend of carefully selected materials, mixed with TMP-3 bitumen. This is a special asphalt, cut back with naphtha, designed for use with traveling mixing plants. Hence the TMP designation. The mineral aggregates, totaling 29 tons per 100 feet on base course and 27 tons on the top course, contained four sizes. Gravel made up 40 per cent of the windrow; there was 30 per cent of sand-gravel; 15 per cent of fine sand; and 15 per cent of filler material.

The bituminous mat was made by blending and drying the aggregates, mixing them with asphalt, and laying the material down with a motor grader. On this project there is also a bituminous armor coat, which will help to resist the penetration of surface rainwater, and the passage of traffic.

Dredge Digs Aggregate

The only available source of rock of any kind in this part of the state is the shallow, muddy streams which meander through the rich farming country on their way to the Missouri River. Such a stream is the Republican River. Skirting the general route of the highway, the river has furnished what little aggregates the engineers have used these past years.

A pumping site was chosen which connects by secondary roads to the middle of the project, and a combination dredge and washing plant was erected.

The dredge was nothing more than a 30 x 40-foot wooden platform mounted on steel oil-drum floats. By Gulf of Mexico standards, it might not even be called a dredge. It moved around the borrow-pit pond by means of swinging cables, the usual anchors and deadmen, and a Beebe hand winch which the operator ran when he needed to move the rig.

The pumping machinery consisted of a Caterpillar D17000 diesel, connected by a flat belt drive and a clutch to an 8-inch American dredge pump. This equipment picked up the sand, gravel and water, and moved it about 500 feet to the washing plant through a floating pipe line.

The 8-inch pipe joints, 20 feet long, were floated on two 2-drum pontoons, one pontoon being placed near each joint end. The steel oil drums were held in place in each pontoon by 2 x 6-inch timbers, bolted tight to prevent the drums from moving.

The sand pump discharged its load after lifting the material about 27 feet above the water surface. The mixture dumped out on a flat riffle table, sloped

(*Continued on next page*)

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slightly to direct the water toward a screen at the bottom. For the production of gravel, a No. 5 screen was used. The pit-run material passed down over this sizing deck, which was 4 x 10 feet.

Fine sand and water passed through the screen, and went back to the upper end of the pond by means of a 16-inch pipe elbow and a wooden flume. Material retained on the screen fell off to a surge bin, where it drained slightly before being loaded out. Dump trucks then backed in under the surge bin and hauled the loads of material to the highway. In the production of sand-gravel, naturally, a finer mesh was used.

Standard Nebraska Highway Department specifications governed the permissible size limits of the material, which are shown in this table:

Size Screen	Per Cent Retained
Gravel:	
No. 4	15-40
No. 10	70-100
No. 50	90-100
No. 200	Max. 5 per cent passing
Sand-Gravel:	
No. 4	5-40
No. 10	45-70
No. 20	60-85
No. 50	90-100
No. 200	Max. 5 per cent passing
Fine Sand:	
No. 50	45
No. 100	50-90
No. 200	Max. 30 per cent passing

Crews Patch Old Road

The existing highway was put in over 20 years ago, and there was little or no base-course material underneath the bituminous road-mixed slab. Few subgrade failures have occurred here, however, strange as it seems. Failures consisted of short sections where the asphalt mix had shoved and warped due to a lowered cohesion of the materials in the mat.

These places were scarified, reworked, and laid down again. After they were rolled back in tight, the highway was then ready for resurfacing.

Two Miles at a Time

Sections for bituminous road-mix were worked a minimum of 2 miles at a time. For the placement of the base course, for example, the trucks from the gravel washing plant went in and dumped the coarse gravel first, at the rate of 11.6 tons per station. Next the sand-gravel was hauled. It went in at the rate of 8.7 tons per station. Fine sand, also from the washing plant, was spread on the basis of 4.35 tons, and the same amount of filler material was also placed. The filler material consisted of Peorian loess, a fine wind-blown soil which is plentiful throughout the state of Nebraska. Its particles nearly all pass the 200-mesh screen on a wash test.

C. & E. M. Photo
Hardly a dredge by Gulf of Mexico standards, but this small Caterpillar-driven outfit pumped mineral filler for U.S. 6, in Nebraska.

With all of the aggregate in a windrow sufficient to build the 2-mile stretch, a Caterpillar No. 12 motor grader moved in to give the material a preliminary mixing. For the first 2-mile section, the State required the motor grader to mix the aggregates until

(*Concluded on next page*)

Do finishing costs floor you?
IMAGINE—in the time it takes to read this advertisement hundreds of feet of concrete floor finished! The Master Screed can handle 6,000 sq. ft. of concrete floor per hour. When you team it up with Master Turn-A-Trowels that finish 800 sq. ft. an hour, you're really pouring profit with concrete!
The MASTER Turn-A-Trowel gives you quick change of trowels from floating to finishing with a single machine.
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Another cost-cutting tool, the MASTER Universal Concrete Vibrator gives you over 9,500 R.P.M. vibration frequencies per minute in concrete. It's lightweight, high speed, simple and rugged. Easy to operate, it works any time, any place.
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Master portable generator plants—heavy duty continuous and standby plants ½ KW to 100 KW
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LUG-ALL
All Purpose
WINCH-HOIST
WEIGHS ONLY 8½ LBS., YET LIFTS, PULLS OR LOWERS 1½ TONS DISTANCE OF 7½ FT., OR ¾ TON DISTANCE OF 15 FT.
LUG-ALL has a built-in 'snatch block' and three swivel hooks for work around corners or in cramped quarters as close as 10½ inches. No brake to slip. 133 ft. of flexible air-craft cable. SAFETY HANDLE prevents accidental overload.
WEIGHT 8½ LBS.
CAPACITY 1½ TONS
$99.50
THE LUG-ALL COMPANY
Wynnewood 2, Pa.

A Bituminous Deck Modernizes Highway

(*Continued from preceding page*)

they were thoroughly blended. That gave the Project Engineer a chance to check the mix design.

Blade-mixing continued, under the sun and wind, for at least three full rounds, or half a day. The materials had to be aerated until the windrow was down to a maximum of 3½ per cent of moisture, and preferably less.

With the windrow dry and in the center of the highway, a Barber-Greene traveling mixing plant then made one trip through the section. It picked the material up and mixed it thoroughly with approximately 6 per cent—depending on the fines in the material—of TMP3 bitumen. Socony-Vacuum asphalt was used, shipped in from refineries over the Burlington railroad. The cars were unloaded on a siding at Edison, and trucked out to the Barber-Greene traveling plant.

Directly behind the Barber-Greene machine, 5 Caterpillar No. 12 motor graders got to work. Their job was to mix, remix, and aerate the windrow, covering with asphalt those few particles not coated in the mixing plant, and aerating the naphtha out of the bitumen. As a rule, even during hot dry weather, it took about 2 full days to get a windrow mixed out, aerated, and ready to lay down. Power cleaning by a Rosco broom and the application of 0.07 gallon of MC-1, preceded the lay down.

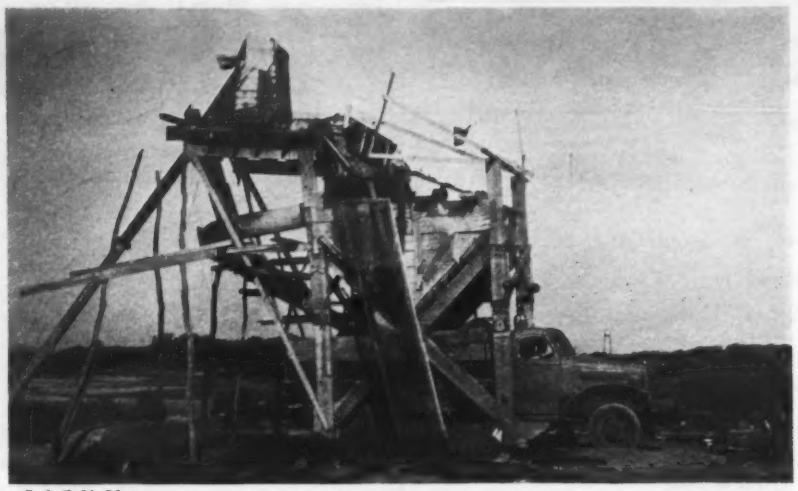
The windrow was laid from the quarter point on the north side of the east-west highway. A motor grader pulled enough of the material to the south side to fill about 2¼ inches at the edge of the pavement. A second pass filled out the north edge. Then another pass or two leveled out the center to the proper crown. While the material was being spread, two pneumatic Bros Wobble Wheel rollers behind rubber-tired tractors were at work compacting the bituminous mixture.

The procedure for the upper mat course was exactly the same as for the bottom course, except that the quantities of materials were slightly different. On that course, 10.8 tons of coarse gravel, 8.1 tons of sand-gravel, and 4.05 tons each of fine sand and filler were used. An 8-ton Huber field roller was also used to top out the compaction on the top course.

The armor coat was placed by sending a 1,050-gallon Rosco distributor through to spread 0.2 gallon of RC-3 asphalt. The chips were spread immediately, using a mechanical spreader box on the rear end of the trucks. Rolling bedded the chips nicely, and the men had made themselves a highway.

Personnel

Design and construction of many such highways as this are under the general supervision of F. H. Klietsch, State Engineer, with A. W. Bohner as Construction Engineer and C. J. Schuster as Project Engineer. H. U. Eby was in charge of the field work for M. M. Lippincott.



C. & E. M. Photo
A loaded truck pulls out of Lippincott's rock plant with a batch of road-mix material and heads for the highway.

Crawler-Tractor Catalog

A new 24-page catalog, featuring the HD-19 crawler tractor with torque-converter drive, has been released by the Tractor Division of Allis-Chalmers Mfg. Co., Box 512, Milwaukee, Wis. It explains the torque-converter drive precisely but simply, and includes a cutaway view of the 20-ton HD-19.

The catalog—"A New Page in Tractor History"—lists the tractor's principal features: improved track design, A-frame design, welded box-section construction, one-piece all-steel steering-clutch case, final-drive housing, finger-tip steering, self-energizing brakes, and two-cycle General Motors diesel engine. In a two-page spread, it introduces the full line of allied equipment matched to the operating needs of the HD-19; it gives additional information on special accessories for special operations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 4.

Sand and Stone Spreaders

Literature describing the Burch stone spreader and Xcel sander is offered by the Burch Corp., Crestline, Ohio. The spreader is designed to spread stone and other materials in depths from 1 to 18 inches and in widths up to 16 feet. It is built in six sizes ranging from 5½ to 10 feet long. The bulletin gives complete specifications on each model and on the extension wings.

The Burch Xcel sander for snow and ice control hangs on the tail-gate of any truck. It is a centrifugal machine powered by a Briggs & Stratton gasoline engine. Its distributing disk is belt-driven and has a starting clutch so the operator can start or stop the flow of material instantly. Features of the unit are highlighted in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 22.

Give your engines more "PUSH"

AND reduce operating costs by lubricating with TEXACO URSA OIL X**

Keep your tractor and truck engines *clean* and you'll have full power when you need it . . . maintenance costs and fuel consumption will both be lower. For heavy-duty gasoline and Diesel engines, the lubricant to use is *Texaco Ursa Oil X***. It's detergent, dispersive, dependable in even the severest service.

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Chassis bearings will get extra hundreds of miles of protection, chassis parts will last far longer, when you lubricate with *Texaco Marfak.*

Wheel bearing replacements will be far fewer when you lubricate with *Texaco Marfak Heavy Duty.* It seals out dirt and moisture, requires no seasonal change.

Crawler track mechanisms run better, last longer, protected with *Texaco Track Roll Lubricant.* It gives long-lasting protection against water, dirt and wear.

Follow the Texaco Simplified Lubrication Plan and save maintenance costs all along the line. A Texaco Lubrication Engineer will gladly give you full details. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write:

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TEXACO

TEXACO

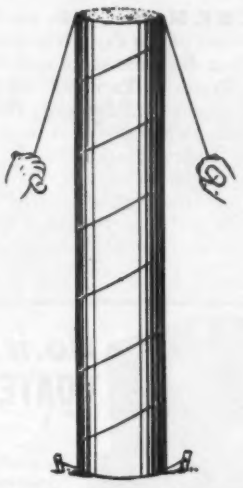
Catalog Suggests Method For Fiber Form Stripping

Contractors using Sonotube fiber forms for erecting piers, columns, underpinning, etc., will be interested in a folder which describes a new quick method, developed by a contractor, for stripping the tubes.

Prior to pouring, a 0.032 spring wire is anchored on the outside of the tube at the bottom. The wire is then run inside the tube and over the top, and is firmly anchored on the outside. Masking tape and wire staples may be used to hold the wire close to the inside of the tube. When ready to strip, the wire is simply pulled down as shown in the accompanying illustration, and the tube splits in two sections allowing it to be easily removed. This method is said to be an improvement over the older method of using a sharp instrument, such as a linoleum knife or hatchet, to split the tube lengthwise prior to peeling.

The folder also illustrates the application of Sonotubes for piles, storm sewers, and weep holes. It includes a number of field photographs. The Sonotube tubular fiber forms are available with inside diameters from 3 to 24 inches and in lengths up to 25 feet.

This literature may be obtained from Sonoco Products Co., Hartsville, S. C., or by using the Request Card at page 16. Circle No. 89.

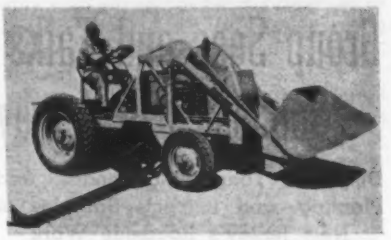


To strip a Sonotube fiber form, anchor a 0.032 spring wire on the outside, at the bottom, before pouring; run it inside the tube and over the top; and anchor it on the outside. When the form is ready to strip, pull the wire down and the tube will split in two.

Steam-Cleaning Unit

A 4-page folder which highlights the engineering features of Chem-Therm steam-cleaning units has been made available by the Chem-Therm Mfg. Co., Pasadena 1, Calif. A cutaway view shows the salient construction features of the cleaner, which is designed to deliver a hard-hitting stream at the rate of 150 gph at a regulated pressure of 30 to 100 pounds. Applications, other features, and user testimonials are included in the bulletin.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 65.



The new 3-AM and 4-AM Shoveloaders are designed to mount on tractors with mowers. Both loader and mower operate independently and one need not be removed when the other is in use.

Loader and Mower Act Independently

Two new Shoveloader models for installation on tractors with mowers, the 3-AM and the 4-AM, have been announced by Lull Mfg. Co., 3612 E. 44th St., Minneapolis 6, Minn. They are so designed that either Shoveloader or mower operates independently of the other and neither needs to be removed from the tractor when the other is in use. The 3-AM is built exclusively for the Case VAI tractor, using either the Case-Detroit 16 or VAI-5 mower attachment. The Model 4-AM is built exclusively for the Minneapolis-Moline RTI tractor using the M-M SMRI mower.

The Model 3-AM has an 1,800-pound lifting capacity and a 7-foot 6-inch dumping clearance, and can be equipped with several alternate loader attachments in addition to the standard ⅜-cubic-yard material bucket. The Model 4-AM has a 2,500-pound lifting capacity and an 8-foot 6-inch dumping clearance, and can be supplied with several alternate loader attachments in addition to the standard ½-cubic-yard material bucket.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 136.

Three New Diesels For Heavy Trucking

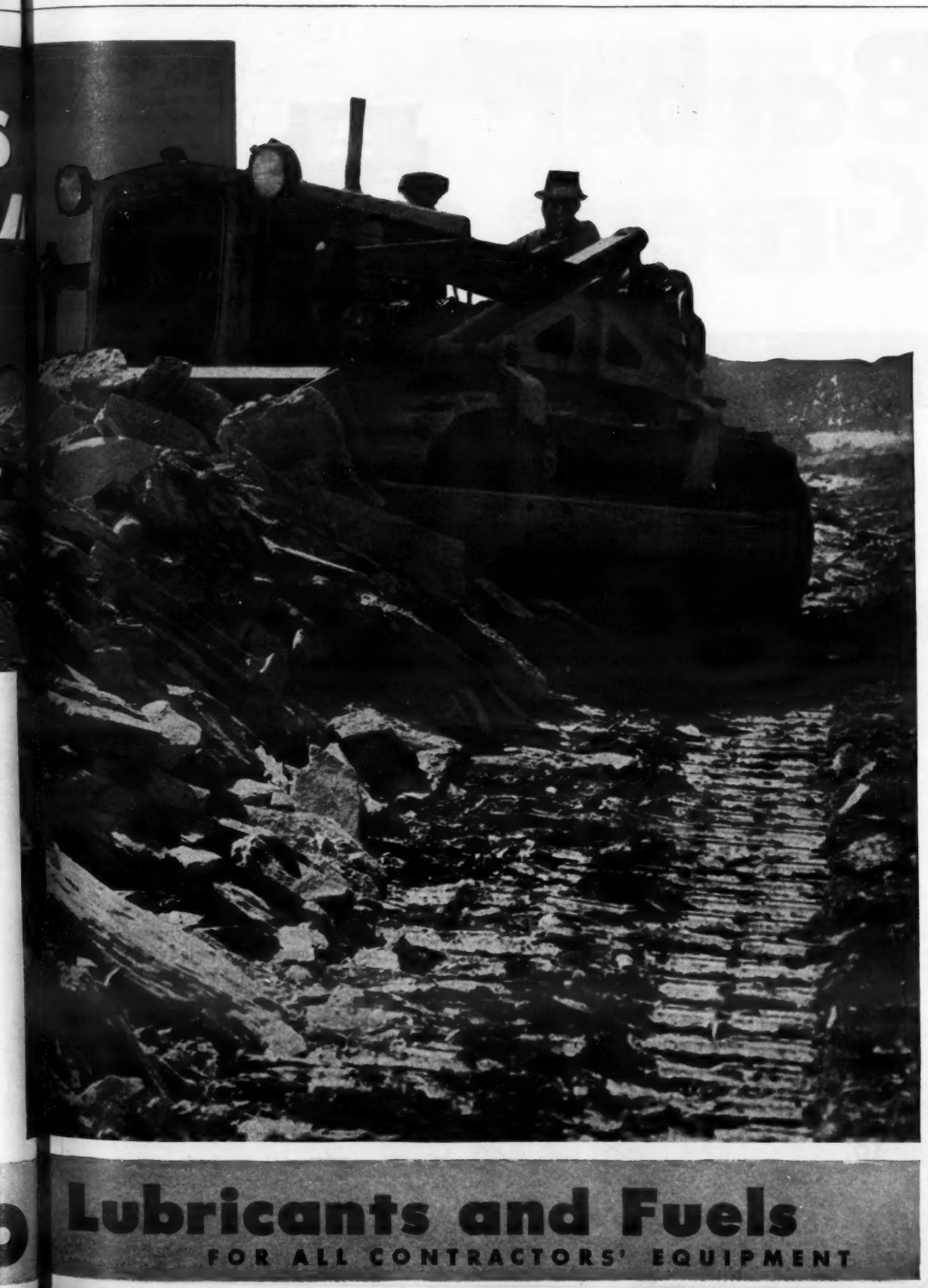
Three new 161 Series heavy-duty diesel truck engines have been developed by The Buda Co., Harvey, Ill. All are 6-cylinder diesels with practically the same mounting dimensions, but with horsepower ratings of 280, 215, and 185 hp. The two larger engines have a 5¼ x 6½-inch bore and stroke with a total displacement of 844 cubic inches. The 185-hp model has a 5¼ x 6-inch bore and stroke, with a total displacement of 779 cubic inches. The largest of the models is supercharged.

These engines have a special monolobe Dyna-Swirl combustion chamber, which enables them to develop increased horsepower, the company explains. The Buda controlled-turbulence low-pressure combustion system is designed to utilize fuel thoroughly with no waste in the form of heavy black smoke. The crankshafts are completely counterbalanced and the engines have torsional vibration dampeners to provide smooth operation. A number of the engine parts are now made of aluminum to reduce total engine weight.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 55.

Rope Co. Has New Officers

The Broderick & Bascom Rope Co. has acquired the entire stock interest of the Broderick family, and John K. and Arthur L. Broderick have retired as directors and as President and Vice President, respectively.Charles E. Bascom is now President of the Company and Joseph H. Bascom First Vice President and Secretary-Treasurer. These officers and J. F. Hedding of Pittsburgh constitute the new Board of Directors. The company was founded by Joseph D. Bascom and John J. Broderick in 1876 and was incorporated in 1882.



Group Sees and Talks Roadsides in Jersey

Discusses Year-Round Seeding and Planting, and Inspects Samples of New Jersey's Roadside Work

✦ THE annual Roadside Development Coordinator's meeting of Division I was held in Princeton, N. J., June 21-23. Oliver Deakin, Parkway Engineer of the New Jersey State Highway Department, and his associates were hosts. Mr. Deakin, who was in charge of arrangements, planned an interesting and informative program combining two discussion sessions and a day and a half of inspection trips. Representatives of the highway departments of Massachusetts, Rhode Island, Connecticut, New York, and New Jersey, and of CONTRACTORS AND ENGINEERS MONTHLY attended the meeting.

At the opening session, the group was greeted by Spencer Miller, Jr., then New Jersey State Highway Commissioner, who urged landscape engineers not to "hide their light under a bushel". Roadside development represents some of the civilizing factors in highway development, he said. Mr. Miller believes that the public is going to demand segregation of kinds of vehicles; that in the future there will have to be roads for trucks as well as parkways for passenger cars. He stressed the importance of adequate right-of-way and of control of access, citing the New Jersey Parkway as an example of what can be accomplished when sufficient right-of-way is taken.

Seeding, Planting Year Round

Year-round seeding and planting were discussed informally for the remainder of the first session. Though seeding has been successful at times usually considered out of season, such as midsummer and very late autumn, no general rules or conclusions can be given, since the success of such projects depends on many variables—particularly the weather just before, during, and immediately after the seeding. It was pointed out, too, that the grass should not be coming in during an unfavorable season; that this is much more important than when the seeding is done.

Experience in moving and planting trees and shrubs "out of season" was exchanged. Every landscape engineer present reported successful transplanting of various types of trees out of season, but methods and procedures varied considerably. It was agreed, however, that special care after the replanting is essential. This, of course, raises the question of its economic feasibility on a large scale in highway work.

Mr. Deakin reported that a test planting is now being made on the Palisades Interstate Parkway. The plant material includes oaks, pine, laurel, dogwood, and some honeysuckle. Results, amount of maintenance needed, and survival records will be kept and studied.

This planting is being done by Howe Nurseries, Pennington, N. Y., and in the afternoon the group was entertained by William Howe and his staff. Mr. Howe has successfully moved and planted trees and shrubs out of season in private landscaping work, and believes that much more can be done to extend the working season, diminish the seasonal aspects of landscaping work, and thus make it possible to keep an organization intact the year around. He told the group about his theories and procedure, and treated it to a demonstration of tree removal, showing how the tree is balled and burlaped, and loaded for transportation to the planting site. A trip through the nursery and a social hour as Mr. Howe's guests concluded a very interesting afternoon.

Roadside Work Inspected

An all-day field trip on Thursday provided an opoprtunity to see some excellent examples of New Jersey's roadside-development work. This included the experimental stabilized turf shoulders constructed in 1947 and reported on by Mr. Deakin at the Highway Research Board meeting in December of that year. Despite no maintenance this year, these shoulders have no ruts, the turf is well established, and there is very little build-up. New Jersey's first roadside-improvement project, in 1930, and another project, vintage 1939, were inspected en route to the Rockefeller Memorial Highway. This 16-mile stretch of highway is an excellent example of selective clearing to enhance the natural attractiveness of the adjoining terrain, as well as of flattened well turfed slopes and judicious planting to supplement existing growth. This work was done in 1939-41. (See C. & E. M., Nov., 1940, pg. 10.)

High spot of the day's trip was a visit to the first 4½-mile section of the New Jersey Route 4 Parkway which was formally opened on June 28. This highway exemplifies the best features of modern highway design. It has a 300-foot right-of-way as a minimum, and a variable median strip with a maximum width of 90 feet. A 10-foot stabilized turf shoulder separates the pavement and the flattened seeded slopes. Existing growth in the median strip and along the roadsides has been carefully selected and preserved, supplemented by some planting, especially at overpass abutments. Attractive overlooks and roadside picnic areas have been provided. The completed section lies between Cranford to Woodbridge; ultimately it is hoped the Park-

(*Concluded on next page*)

Do it the EASY Way with the COATES ELECT-DRAULIC Power Unit

A complete 6-volt power unit for operating truck-mounted snow plows. Operator raises or lowers plow by simple electric switch in cab. Unit may be located where ever convenient.

Write for Circular

Also makers of straight-blade and V-plows, and oil-road smoothers for reconditioning old asphalt surfaces.

A few choice territories still open for good, live distributors

COATES MFG. CO., CORYDON, IOWA

Barber-Greene

THE ONLY VERTICAL BOOM DITCHER

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digs clean—leaves no ramp • discharges on either side

Here's an exclusive ditcher feature that saves a lot of hand labor. The Barber-Greene's vertical boom digs *straight down*, right up to walks, foundations, underground piping and mains, etc. *There's no ramp to run up digging costs.*

Closely spaced, self-cleaning "kick out" buckets, traveling at high rate of speed, cut like a milling machine . . . leave a clean-walled trench. It's this efficient operating principle that gets the B-G Ditcher through materials as tough as coral rock — down to 8 feet, 3 inches; widths up to 24 inches. Feeding speeds range from 10 inches to 8 feet per minute.

***An adjustable spoils conveyor discharges on either side*, and the automatic overload release protects both the machine and hidden objects.**

Find out how this compact, maneuverable, easily controlled unit can keep your trenching costs down . . . and what varied work it will perform.

131A EXP

BARBER • GREENE COMPANY AURORA, ILLINOIS

Constant flow Equipment

LOADERS PERMANENT CONVEYORS PORTABLE CONVEYORS COAL MACHINES BITUMINOUS PLANTS FINISHERS DITCHERS

way will traverse the entire length of the state.

The concluding feature of the trip was a visit to a portion of the Blue Star Drive. Garden clubs and other groups have contributed dogwood and other flowering shrubs for planting along this route, which was designated as the Blue Star Drive in tribute to the men and women who served in World War II.

Other Subjects

Other subjects under discussion during the meeting included a request from Wilbur Simonson, Head, Roadside Development Section, Bureau of Public Roads, for pictures showing various types of water-conservation measures, such as the conversion of unsightly borrow pits into lakes, retention basins to slow run-off, etc.

It was also suggested that a pamphlet or brochure should be prepared outlining the way to start and carry out memorial projects such as the Blue Star Drive. All highway landscape engineers present were asked to provide material based on their experience which could be correlated and used in such a booklet.

The program for roadside development sessions at the AASHO meeting in Miami in December was brought up, and suggestions for topics to be discussed were requested. One mentioned was public relations. Other suggestions should be submitted as soon as possible to Wilbur H. Simonson, Secretary of the AASHO Committee on Roadside Development, who is making the same request of the other Coordinators, so that the AASHO program can reflect and help in the interests and needs of highway landscape engineers throughout the country.

Public relations, how to establish relations with and secure the cooperation of the press, talks before civic groups, the possibility of getting roadside development mentioned on radio programs, work with the schools by means of poster contests, etc. were discussed.

The first year of the Division I Roadside Development News Letter was reviewed and it was agreed to continue the project.

Mr. Deakin and the New Jersey Highway Department were commended for the fine examples of roadside work which the group inspected, and for the well arranged program which provided so interesting and successful a meeting.

The next meeting of the group will be held some time during the month of June, 1951, probably in New York State. John V. McManmon, Landscape Engineer of the Massachusetts Department of Public Works, is Coordinator for Division I, which includes the New England states, New York, and New Jersey.

New Kerosene Lantern

A new kerosene lantern has been developed by Handlan, Inc., 615 S. First St., St. Louis, Mo. Of simple construction, the Challenger lantern is designed to withstand hard use under rigorous conditions. The 33-ounce oil fount gives a burning time exceeding 200 hours, using a ¼-inch-round wick and ruby fresnel globes, the company says.

The Challenger is made of heavy terneplate with the bottom of the fount double-seamed and recessed. Its streamlined design makes it easy to keep clean says Handlan. Finished in red enamel and supplied with a ruby fresnel globe, the Challenger measures 14¼ inches in height and has a base diameter of 6¾ inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 140.

Sickle-Bar Grinder

A new sickle-bar grinder for both maintenance shops and field use has been developed by Lantz Mfg. Co., Inc., P. O. Box 124, Valparaiso, Ind. Operated by one man, the Lantz sickle grinder provides proper edge and uniformity of bevel on all types of sickle bars, the company says, and increases their total useful life. It handles bars from 1 to 7 feet long.

Division I roadside development engineers inspect Madison Hill overlook and picnic area on New Jersey's first parkway, Route 4, which was opened to traffic on June 28.

The grinding stone used on the Lantz grinder will handle sickles of varying point-angle. It grinds standard field-mower bars and smaller garden-tractor bars with the same grinding stone. The spring-loaded table, which keeps the sickle section against the stone, accommodates the variation in angle between different types of sections.

The grinder may be mounted on a wall, studding, or bench at a height convenient for the operator, or on a pick-up truck for field use. It is available with electric motor for shop use or gasoline engine for field use, and is furnished without a power source if desired.

Further information may be secured from the company. Or use the Request Card which is bound in at page 16. Circle No. 94.

Traffic Deaths in '50 Soar

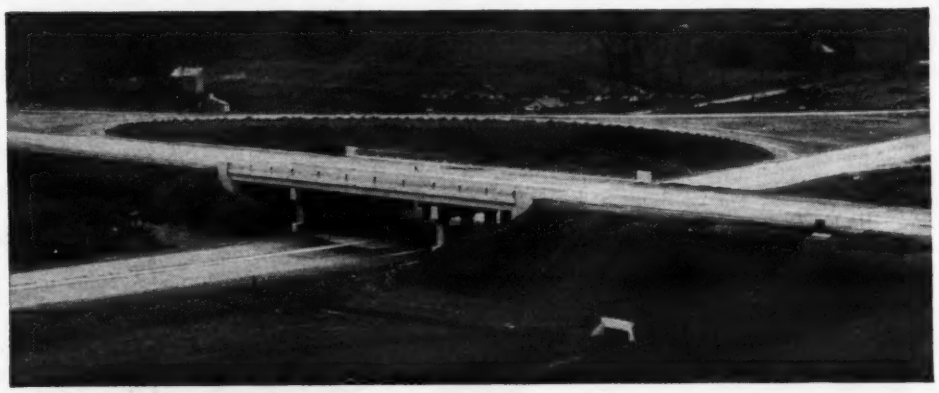
Traffic deaths for the first third of this year were up an average of 11 per cent per month over last year—"casualties of America's highway crisis", they have been called by Lt. Gen. Eugene Reybold, Executive Vice President of the American Road Builders' Association. "Unless our roads and streets are modernized," said Reybold, "the work of safety organizations . . . will not hold down the postwar slaughter. . . . Without rebuilding roads and streets to accommodate modern traffic, we cannot stem the fatality rate which can be expected to continue to skyrocket in the face of record-shattering motor-vehicle production."

Ten Years Ago...

A Decade of ATLAS DURAPLASTIC AIR-ENTRAINING PORTLAND CEMENT

this test paving was laid in Minneapolis—the first commercial use of Atlas Duraplastic air-entraining cement. Badly scaled background section was made with regular cement. Foreground concrete was laid at the same time with Duraplastic cement. Here are both sections, photographed ten years later, after ten severe winters, heavy applications of de-icing salts and many freezing-thawing cycles—convincing proof of Duraplastic concrete's lasting durability. Longitudinal structural crack shows some raveling. Note perfect transverse joint.

Today...It's "DURAPLASTIC* throughout" on more and more paving jobs



Interchange underpass connecting parkway with Route 60 near Greensburg, Pa. Atlas Duraplastic used throughout. Contractor: W. L. Johnson Construction Company, Hicksville, Ohio.

GROWING NUMBERS of engineers and contractors specify Atlas Duraplastic cement for all types of concrete construction in modern highway paving. For straight paving, and for underpasses, overpasses, bridges—more and more—it's "Duraplastic throughout."

That's because experience has proved that Duraplastic air-entraining portland cement makes more durable concrete, that it fortifies concrete against the effects of freezing and thawing—renders it highly resistant to the scaling action of de-icing salts.

And Duraplastic cement requires less mixing water for a given slump, makes concrete more plastic, more cohesive, more workable and more uniform. Bleeding or water-gain and segregation are minimized. The concrete dumps, spreads and screeds easily, permits finishing closer to paver, allows earlier protection for curing. And in structural work, surface appearance is improved.

Duraplastic cement makes better concrete at no extra cost. It provides the precise amount of air-entraining agent interground with the cement for satisfactory field performance. It complies with ASTM and Federal Specifications, sells at the same price as regular cement, calls for no unusual changes in procedure.

Send for free new booklet, *"A Decade of Atlas Duraplastic Air-Entraining Portland Cement." Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.*

• • •

Offices: Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

CE-D-105

ATLAS DURAPLASTIC TRADE MARK REG. U. A. C. CO.

AIR-ENTRAINING PORTLAND CEMENT

MAKES BETTER CONCRETE AT NO EXTRA COST

A UNIVERSAL ATLAS PRODUCT

NBC SUMMER SYMPHONY CONCERTS—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—June to September*

For not-so-large jobs, a small size Model Super D Tournadozer. Bowl capacity is 1.8 cubic yards.

New Tractor-Dozer

A rubber-tired four-wheeled tractor-dozer for relatively small jobs has been developed by R. G. LeTourneau, Inc., Peoria, Ill. This smaller-size Model Super D Tournadozer is powered by a 122-hp diesel engine and has a bowl capacity of 1.8 cubic yards. It has four speeds forward up to 19 mph and two reverse.

Its rubber tires are available in two sizes—21 x 25 or 56-inch-wide base rim—and permit operation in soft going at reduced air pressures, LeTourneau says. The Super D is equipped with a Tournamatic transmission and air-synchronized multiple-disk clutches. Steering is accomplished by controlling wheels on each side through the use of air-actuated multiple-disk clutches and brakes. The bowl is cable-controlled and is operated through an electric motor and gear reduction box.

These are the overall specifications on the Super D Tournadozer: wheelbase 5 feet 11⅝ inches; length 15 feet 2 inches; height 8 feet 1 inch; width of blade 11 feet 3 inches; height of bowl 36 inches. The blade can be raised 44 inches above the ground; the distance the blade can be lowered is unlimited.

Attachments available include snow plow, root rake, side-boom crane, Tournaskidder (overhead winch to facilitate dragging of logs, beams, forms, etc.), single and double-drum power-control unit, and drawbar for cable-operated scrapers.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 99.

A New Portable Saw

A new 6-inch Thor portable electric saw with heavy-duty construction features is announced by Independent Pneumatic Tool Co., 175 N. State St., Aurora, Ill. Its features include long-shaft transverse-motor mounting; die-cast aluminum housings; steel inserts for bearings and threads to maintain critical parts in permanent alignment; built-in saw blower, which blows from the inside and keeps the cutting line clear and the motor free from dust; steel rip guide with adjustments for thickness or material being cut; large switches to provide protection against accidental starting; ball-bearing blade-guard with rubber snubber; finger-tip control for depth and bevel cuts; and complete ball-bearing construction.

Further information may be secured from the company by requesting Circular No. JE-1259. Or use the Request Card at page 16. Circle No. 130.

Circular on Power Hammers

Five power hammers ranging in capacity from 25 to 500 pounds are illustrated and described in a new circular prepared by Little Giant, Inc., 126 W. Rock St., Mankato, Minn. For general work, these models have a forging capacity from 2 to 7-inch round. The largest unit has a maximum capacity of 15 inches. Detailed information is given on the construction of the ram, toggle arms, hard-maple blocks, frame and sow block, crankshaft bearings, and dies.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 36.

Mobile Field Repair Shop

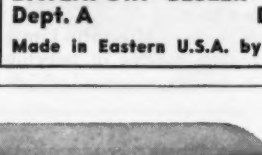
Complete and detailed specifications of the Model M mobile shop for machine, welding, and repair work have been prepared by Couse Mfg., Inc., of Newark, N. J. This shop is designed to replace the average stationary shop or act as an important adjunct to the large repair station. It is a completely coordinated and engineered unit, the literature explains, with equipment and working space for a crew of 2 to 12 men. The specification literature describes and pictures each tool in the Couse shop; its descriptive passages are also translated into French and Spanish for the overseas user.

The Couse Type M body, mounted on a 1½ to 3-ton chassis, has lifting sides, catwalks, workbenches, tool compartments, and a high-carbon-steel work place. Its equipment includes a 3-ton crane with an 18-foot lift; 110 and 220-volt power supply; flood lamps; a wide assortment of welding accessories and electrodes; a complete selection of tools and accessories for arc and oxyacetylene welding, cutting, brazing, etc.; hydraulic equipment; carpenters' tools; plumbers' tools; an air compressor; pneumatic tools; a radial drill press; blacksmiths' tools; electric-powered tools; a lathe and lathe accessories.

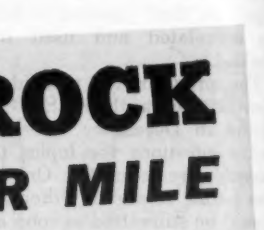
This literature may be obtained only by writing on your company letterhead to Couse Mfg., Inc., 300 Passaic St., Newark, N. J.

Sales Manager for Huber

D. M. Brendle is now Eastern District Sales Manager for the Huber Mfg. Co., Marion, Ohio. From headquarters in Ephrata, Pa., he will work with distributors of Huber road equipment in the New England states, New York, Pennsylvania, Maryland, Delaware, New Jersey, and Virginia. Mr. Brendle replaces the late Frank L. Hoover.



CHAMPIONS of the WINTER HIGHWAYS
for
FASTER•SAFER•CLEANER
SNOW REMOVAL
DAVENPORT-FRINK
SNO-PLOWS



V-Blade Sno-Plows for all sizes and makes of motor trucks—also tractors, motor patrols and locomotives.

Straight Blade or Reversible Blade Sno-Plows are desirable for lighter snows or for cleaning one side of street or highway at a time.

DAVENPORT BESLER CORPORATION
Dept. A Davenport, Iowa

Made in Eastern U.S.A. by CARL H. FRINK, 1000 Islands, CLAYTON, NEW YORK

SHORT CUT in ROCK
@1,000,000 YDS. PER MILE

HARRISON CONSTRUCTION CO. SLICES PITTSBURGH HILLSIDE WITH 9 LORAINS!

Talk about tough ones! 1,250,000 cu. yds. of excavation . . . mostly rock . . . side hill cuts up to 240 ft. deep . . . slicing off the sides of a mile long mountain. It's a new $3,000,000 four lane super-highway on route 247 in Pittsburgh's southside — known as the West End By-Pass to South Hills.

Harrison Construction Co., long-time Lorain users, moved in a fleet of 9 Lorains — a part of the 36 Lorains they have purchased over the years — for double shift operation.

Scampering over the hillsides like a mountain goat, this 3/4 yd. Lorain shovel acts as a pilot shovel to build access roads to the tops of the cuts so that bigger Lorains can get onto the job and turn out the major production.

Tough jobs . . . the roughest rock . . . big fleets . . . successful contractors . . . go hand in hand with Lorains. Owners like Harrison Construction Co. have proved by experience over many years on many jobs that Lorains pay off in profitable performance . . . that's the reason Harrison made this big, tough job *an all Lorain job!*

It will pay you to learn why the big names pick Lorains . . . from your helpful, handy Thew-Lorain Distributor!

THE THEW SHOVEL CO.
LORAIN, OHIO

THEW LORAIN®
SHOVELS • CRANES • CLAMSHELLS • DRAGLINES
HOES • MOTO-CRANES

Two big Lorain shovels, working on different benches, gouge out the rugged hillside. Most material was heavy rock, and the Lorains made easy work of clay, sandstone, limestone, slate and shale, too!

Sand and Soil Mixes, A Contractor's View

Early Experimental Work With Them, Their Evolution And Future, Some Personal Recommendations

By CHARLES D. JONES, Jones Construction Co., Inc., Greenbelt, Md.

✦ AS this paper is to cover my personal experience with sand mixes and soil stabilization, I believe it is in order to give a little historical background which may clarify the evolution of this type of low-cost paving.

During the early twenties, when I was employed by the Oregon State Highway Commission, there was a stretch of bank-run gravel on the Old Oregon Trail, which ran through the desert. Due to lack of cohesive binder, it was a hazardous road to travel; so we finally decided to add a clay binder, water it to form a mortar, and road-mix the entire section. This, I believe, was one of the first road-mix jobs, particularly in the northwest.

Later I used the same procedure to bind crusher-run stone on roads in the rain belt of western Oregon—with excellent results. It was during these years that we first heard about the use of road oil as a binder for desert sands, and my curiosity was aroused as to what might be done with soils. About 1927 I had the chance to mix road oil with sand-clay on a small landing strip; results were fair.

Research With Asphalt Binder

Opportunity for a real proving ground did not develop until 1930, when I became associated with the American Bitumuls Co. I was intrigued by the possibilities of emulsified asphalt, and Paul E. Tignor, an aggressive engineer with the Glenn L. Martin Co., Middle River, Md., had been toying with the idea of treating local soils. So we decided to build a small experimental runway using emulsified asphalt as the binder.

We had no specifications and no previous experience to help us, no laboratory tests, no formulae—only a desire to see the idea work. We constructed the runway in a most primitive manner, using farm equipment and homemade contrivances that we developed as we were confronted by various problems. The work was performed during heavy autumn rains, and we ran into freezing weather. The existing soil ranged from sand to a colloidal clay, the latter with a high content of 200-mesh material.

The runway—without wearing surface—was used during the first winter by trimotor transports flying between New York and Washington, D. C. It wasn't until 1936 that a wearing surface was placed on this 4-inch soil-stabilized base. The Martin job proved that this type of work was practical but still needed plenty of research, so it was kept under observations and test data were accumulated for the next few years.

Depression Boosts Low-Cost Work

Suddenly stabilization was brought to the front and its popularity accelerated by the development of travel plants and rubber-tire rollers, along with the use of large patrol graders. This was the depression era, construction money was scarce, and soil stabilization was welcomed in many places. In fact, the dollar was stretched a little too far on many jobs; and these particular jobs, where trouble was encountered, received the greatest publicity.

But we profit by our errors, and it was through this trial-and-error period that technicians developed the tests and construction requirements that eliminated many hazards of several years ago. Instead of criticizing, I feel we should pay tribute to those pioneers who had the initiative to carry on when that type of work was still in its infancy.

Sand-Mix Landing Mats

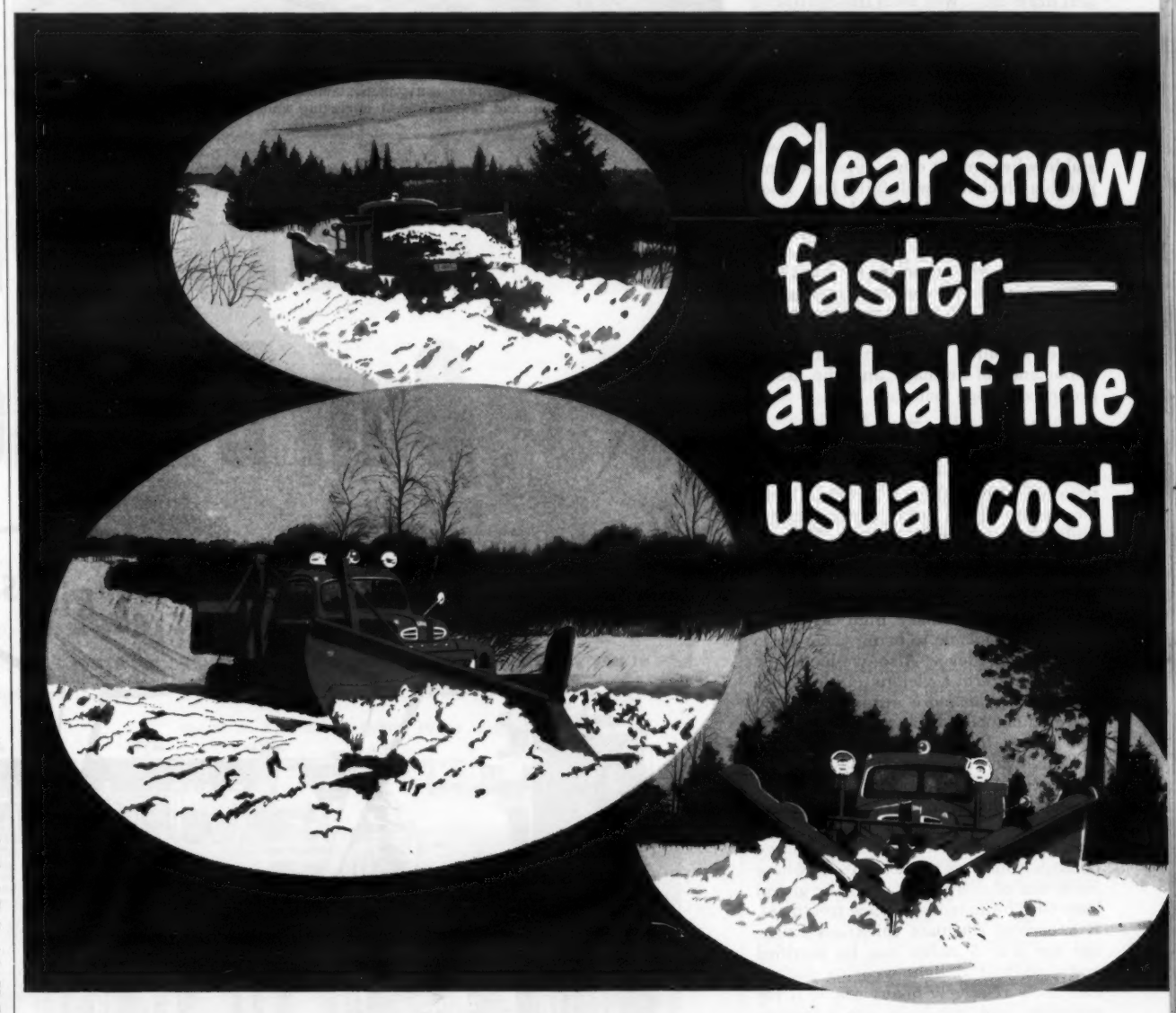
In 1941 and 1942 I was identified with a project involving sand mixes on three large landing mats constructed for the Navy at Lakehurst, N. J. On the first mat, native sand without any additional material was used. Laboratory tests showed this material to be stable after it was mixed with emulsified asphalt. This was borne out in the field by the fact that crawler tractors had to tow the supply trucks to the travel plant; but this formerly unstable sand was very stable after being mixed, spread, and compacted. On the second and third mats, the laboratory tests showed that an admixture of minus-200-mesh material was required. This was also proved by field experience.

An interesting feature of this job from the contractor's viewpoint is that cold weather forced us to stop mixing in December and we left the mixed material in windrows until the following spring. Only a light crust had set up on the surface of the windrows, and the material was extremely workable. In fact, it was no different to handle than freshly mixed material.

Recommendations

My personal construction experience with sand and soil mixes in recent years has involved the use of travel plants. I personally favor the kind that will permit more accurate control of the bitumen content and, by the use of a sized windrow, give definite control as to thickness of pavement. While other methods have given good results, this extra refinement is well warranted when you consider that it makes up only a very small part of the cost of the finished job.

(Concluded on next page)



● Operators in increasing numbers tell us that Marmon-Herrington *All-Wheel-Drive* Fords are the fastest snow-removal trucks your money can buy—yet they cost you less than any other multiple-wheel-drive trucks on the market.

The pictures above show Marmon-Herrington *All-Wheel-Drive* Ford Trucks clearing deeply drifted roads in northern Wisconsin and Minnesota. Here are typical owner comments: ***Truck has amazing power and traction—Plows deep, heavy snow with no effort at all—Makes more trips a day than the heavier all-wheel-drive it is working with—Does same work as a 10-ton all-wheel-drive in gravel hauling—Recommend it to any highway department for snow removal and all-around work.***

Marmon-Herrington offers the widest range of *All-Wheel-Drive* Ford models—95, 100, 110 and 145 hp. engines—a model of the right size and capacity for every snow-removal requirement. Let your Marmon-Herrington dealer show you the model that's exactly right for your local needs.

MARMON-HERRINGTON COMPANY, INC.
1523 W. Washington St., Indianapolis 7, Indiana

SERVICE AVAILABLE AT FORD DEALERS EVERYWHERE . . .

AUTHORIZED Ford SERVICE

Marmon-Herrington *All-Wheel-Drive* Fords are, for the most part, built of standard Ford Parts. Consequently, fast, efficient, low-cost maintenance and repair service is available at Ford dealers everywhere. When, occasionally, special parts are required, they are quickly obtainable through Marmon-Herrington distributors, conveniently located in principal cities the world over.

MARMON-HERRINGTON
All-Wheel-Drive
FORDS

Sand and Soil Mixes, A Contractor's View

(*Continued from preceding page*)

By using motor patrols in conjunction with rubber-tire rollers, the laydown can be handled in relatively thin layers. This speeds up dehydration and results in density throughout the entire surface. Guard against attempting to compact a thick layer of material. It will only cost you more in the long run, and the results are far inferior to the thin-layer method.

Above all, here is the important thing as far as a contractor's purse strings are concerned—a time-proved rule in highway construction that cannot be ignored: the three most important items of construction are "drainage, drainage, and drainage". Woe unto the contractor who paves over a subgrade made unstable by moisture conditions, and woe unto the engineer who faces the future maintenance.

This is true of any pavement but especially of soil or sand mixes. Without a wearing surface they will remain stable where many other types of comparable thickness will fail. But when a wearing surface is placed, and there is moisture in the subgrade, capillary moisture cannot "breathe out". The moisture is imprisoned in the base, and, when solar heat builds up, vapor pressure results. Vapor pressure means loss of surface tension and that means loss of stability. So again I stress the importance of drainage and the use of proper subgrade material.

The Future of These Types

As to the future of these types of paving, I am most optimistic. At one time we thought $50,000 a mile a lot of money for a road; today we see superhighways costing over $1,000,000 a mile. But these are primary trunk roads. There is still a large field in secondary and county highways, and in the rehabilitation of primary highways until funds are available to bring them up to superhighway level. Also, we have now what some term a vicious circle: more highways mean more automobiles and more automobiles mean more highways. The faster the circle goes, the more the highway dollar will have to be stretched. And this means using local materials whenever it is possible to do so.

For the contractor there is a large potential business in those areas where roads are of untreated gravel, or gravel base with bituminous surface treatment. If a base of adequate thickness exists, the top 4 or 5 inches can be scarified and stabilized. A light wearing surface can carry relatively heavy traffic if the subgrade and sub-base are adequate to the task.

Another field that I hope will open up to contractors is the use of sand mixes as a sub-base under rigid slabs. This appears to have real possibilities and should eliminate most of the costly maintenance now being done by subsealing existing pavements. Another field that has been neglected is the bituminous treatment of quarry waste or fines. As a cold mix, this cannot be surpassed.

As an engineer, vendor, and contractor, I have had the opportunity to be closely associated with many projects over a period of years, and I firmly believe that sand and soil mixes have a definite place in highway and airport surfacing. Dense mixes using sand, soil, or sand-gravel, while still in their infancy, are now overcoming early adverse criticism and are recognized for their true worth. The future should open up new and larger fields of this type of construction to the contractors of this country.

From a paper presented at the 47th Annual Meeting of the American Road Builders' Association, March 6-9, Cincinnati, Ohio

Stow's new electric vibrator has a 2½-inch-diameter head. The motor delivers up to 9,500 rpm and features skid mounting and double handles.

Concrete Vibrator

A new electric vibrator with a 2½-inch-diameter vibrator head has been announced by the Stow Mfg. Co., Binghamton, N.Y. It features skid mountings, splash-proof motor and switch, double handles for lifting in horizontal or vertical positions, and high-speed sealed ball bearings.

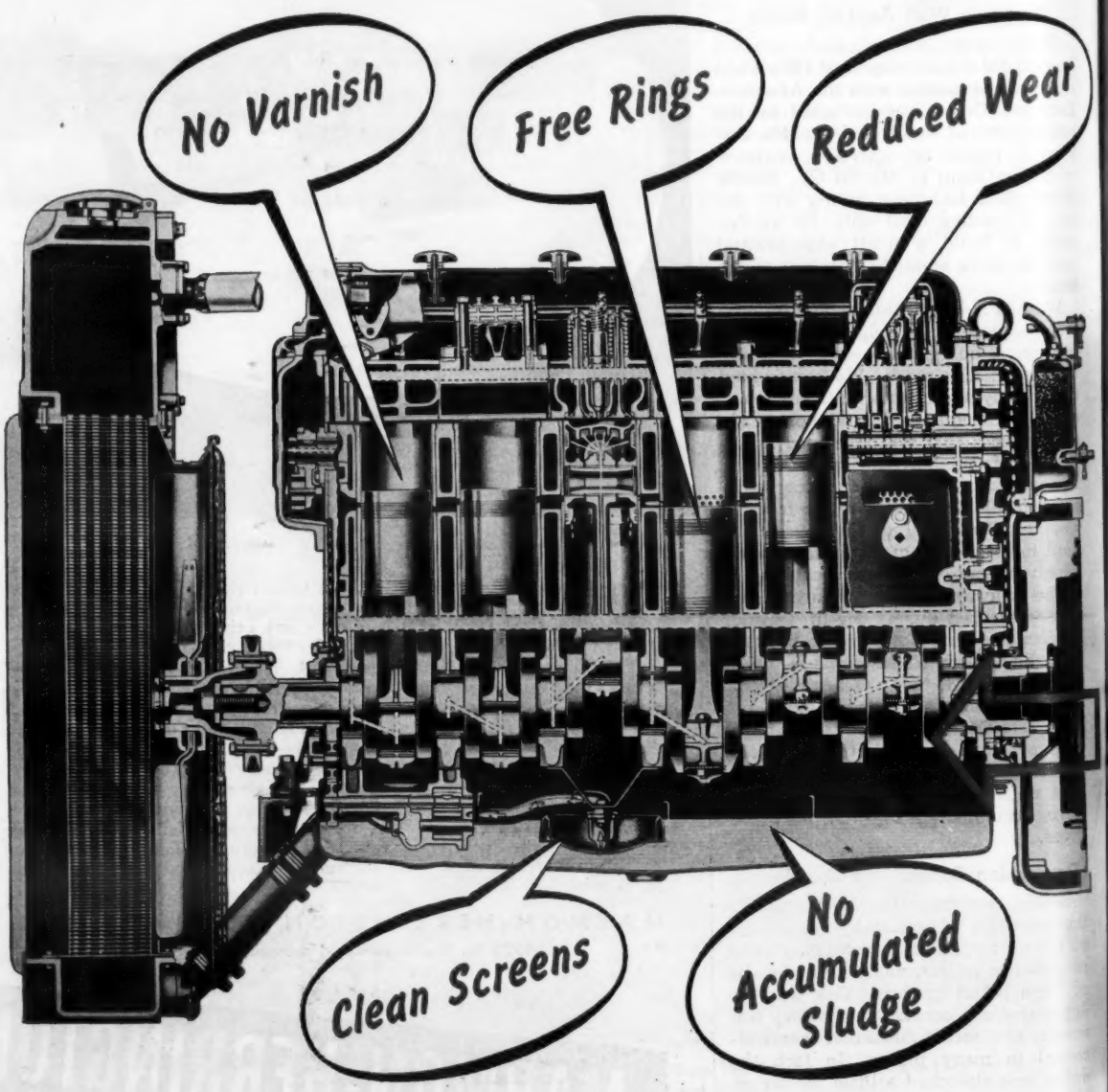
The vibrator is available in 5 models with from one to five 7-foot shafts. It operates on 115-volt 25-60-cycle ac or 115-volt dc power. The motor is rated at 16 amperes at full load. The unit is equipped with a Stow flexible shaft and sealed-in-oil vibrator head.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 152.

ARBA to Meet in Milwaukee

The 48th Annual Meeting of the American Road Builders' Association will be held March 12-14, 1951, in the Schroeder Hotel in Milwaukee.

In SEVERE DUTY, Can Double Engine



SINCLAIR HEAVY

Your Nearest Supplier of Sinclair Products Will Gladly Arrange for Lubrication

Connecticut Designs, Builds Sign Trucks

The Connecticut State Highway Department is now using seven sign trucks which it developed as a result of the increase in the number and variety of signs required to control parkway and expressway traffic. The trucks have all-metal all-welded steel bodies which were designed in the former Division of Highway Control and built by the Equipment Service Co., Hartford. They are mounted on General Motors 2½-ton truck chassis.

Each truck will accommodate 390 signs of various sizes and shapes in easily accessible compartments. The tools of the trade—step ladders, shovels, post-hole diggers, and sledge hammers—are in the rear, and so are such materials as assorted lengths of posts and pipes, sand, cement and water. The tops of the trucks are designed to carry large 8 x 8-foot construction signs.

Many of the body attachments and details of storage are the result of suggestions from the men in the best position to know the requirements—the sign crews. They suggested, for example, the sliding platforms which may be pulled from either side of a truck to serve as a place to stand when driving tall posts. The platforms are surfaced with a non-slipping safety tread to provide safe footing for swinging a sledge hammer.

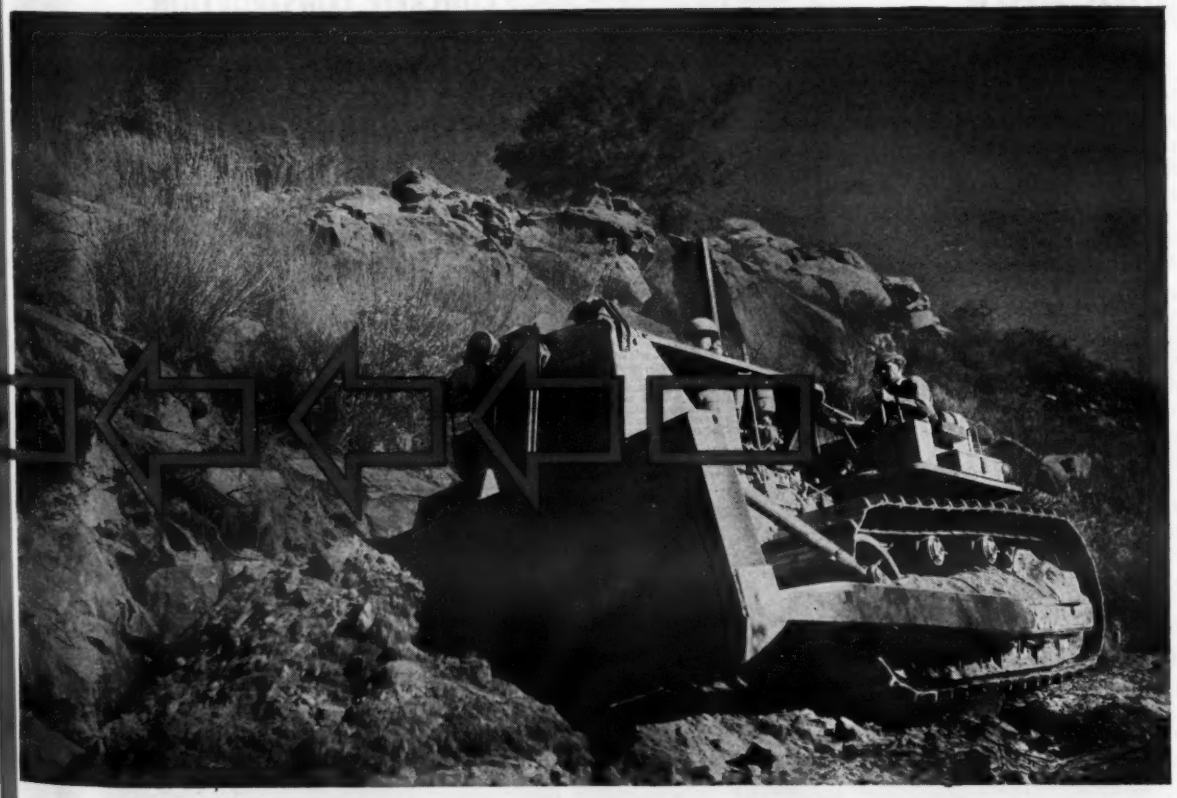
"A place for everything, and everything in its place"—a goal fully realized for Connecticut's sign crews with this new sign truck designed by the Department.

New SUPER TENOL Life Between Overhauls

New Sinclair SUPER TENOL is an oil specially developed to eliminate the high maintenance costs so frequently encountered in both types of "severe duty" service: — 1. High temperature, high speed, over-load; and 2. Low temperature, light load, long idle, stop-and-go.

Under these abnormal conditions, operators report new SUPER TENOL has more than DOUBLED the life of their equipment between overhauls.

If you operate diesel-powered or gasoline equipment in severe duty service it will pay you to change to new SUPER TENOL now—to keep equipment in operation many more days each year, to save time, labor and money.



DUTY LUBRICANTS

Counsel or Write to Sinclair Refining Company, 630 Fifth Avenue, New York 20, N. Y.

Six-Cylinder Diesel In the 275-Hp Class

A new lightweight diesel engine is now manufactured by Detroit Diesel Engine Division of General Motors, 13400 W. Outer Drive, Detroit 28, Mich. It is a 6-cylinder 2-cycle unit rated at 275-hp and developed to meet the higher power requirements of large earth-moving vehicles and general industrial, oil-field, and marine equipment. It has a 110-cubic-inch displacement per cylinder.

Features, according to the manufacturer, include blower scavenging with a new gear-driven centrifugal blower furnishing considerably more air for the cylinders than is needed for combustion. Location of the blower at the rear of the engine, above the flywheel, contributes to compactness. The blower impeller is an aluminum-alloy forging 9 inches in diameter and is of the open type with radial vanes; it has a spiral air inlet.

GM unit injectors (one for each cylinder) pump, meter, and atomize the fuel, and are easily removed for inspection or exchange. Cylinder block and head are one-piece castings, both being symmetrical about a vertical plane between the No. 3 and 4 cylinders. This symmetry allows the cylinder head and block to be reversed, giving a choice of rotational directions and making possible a variety of accessory locations to suit installation requirements, Detroit Diesel points out.

All wearing parts such as cylinder liners, bearings, valve guides, and inserts are precision parts and are replaceable. Use of a 1-5-3-4-2-6 firing order, together with two-cycle operation, is said to provide a smooth-running well balanced engine. Only four small crankshaft counterweights are necessary, and these only to equalize bearing loads.

The customary forced-feed lubrication is provided, with a gear-driven pump delivering 45 gpm at 1,800 rpm. The oil gallery is a separate tube cast in the cylinder block, eliminating long-hole drilling operations. Oil pans have removable-bottom cleanout covers. Pistons are triple-cooled with water, oil, and air.

The new 110 diesel is offered as a bare engine; with full equipment for marine or industrial use; or with special accessory arrangements for a variety of end products. Optional accessories, which may be powered directly from the gear train, include a hydraulic steering pump, an air compressor, and a pump to circulate oil through a General Motors torque converter. The torque converter is designed specifically for the engine and installed as an integral unit at the factory for those applications where a fluid drive is advantageous. The General Motors hydraulic reverse and reduction gear is also available for marine applications.

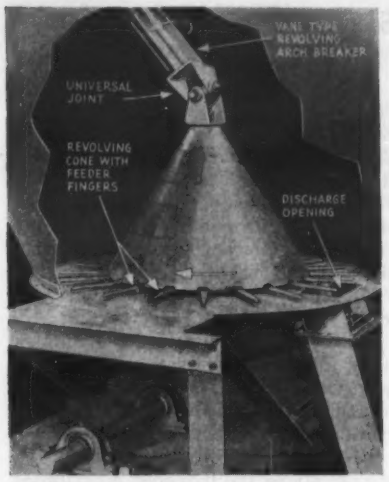
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 129.

Circular-Wall Forms

A 4-page folder on circular-wall forming is offered by Universal Form Clamp Co., 1238 N. Kostner, Chicago 51, Ill. The system uses standard Uni-Forms throughout. Narrow circular wall fillers are used with the outside wall forms only, to compensate for circumferential differences. The use of narrower fillers and 2-foot form widths is said to keep curvature deviations to a minimum. Alignments need be made only on the inside.

The bulletin illustrates the Uni-Forms in use and explains that this system permits all interior forms to be placed before exterior forms, and enables outside forms to be placed in lifts for control of concrete placement.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 142.



The Stephens-Adamson circular bin discharger is designed to loosen bulk materials—cement, for example—in bins so they can discharge freely or in measured volumes.

Cement Discharger Prevents Clogging

A man swinging a sledge is too often the answer to faulty bin discharge in plants handling bulk materials. Stephens-Adamson Mfg. Co., of Aurora, Ill., offers its answer to the problem in a circular bin discharger which loosens bulk materials in bins and permits them to discharge freely or in measured volumes. This unit is said to be particularly applicable for cement handling.

The accompanying photograph illustrates the discharger equipped with a rotary vane-type arch breaker. The feeder fingers, rotating with the center cone, carry material over the discharge opening. Where measured discharge is required, a simple hood over the opening will usually give a controlled volume feed. The arm of the vane-type arch breaker is given a rotary motion by means of a universal-joint connection to the center cone. Since the end of the archbreaker arm rests against the bin wall, there is a tendency for it to travel around the circumference of the bin. However, if the material offers too much resistance, the arm can simply rotate in place, cutting at the material until the way is cleared.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 37.

Improved Diesel-Power Engines and Generators

Refinements in engine and generator design and an increase in the number of models offered have recently been disclosed in new literature issued by the Murphy Diesel Co., 5317 W. Burnham St., Milwaukee 14, Wis. Form 104 describes the company's diesel engines and Form 106 describes the diesel generators.

The Murphy diesels come in five 4-cylinder models and six 6-cylinder models ranging from 90 to 200 hp. When used for the generation of electricity, these units provide a range of power between 60 and 133 kw.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 81.

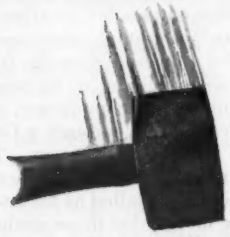
Diepenbrock at Marlow

J. B. Diepenbrock has joined Marlow Pumps, Ridgewood, N. J., as District Sales Representative on the west coast. He will take charge of sales in California, Oregon, Washington, Idaho, Nevada, Arizona, and western Montana and Utah.

The world's largest crane on rubber, the Lorain MC-820, is being tested at Fort Belvoir, Va., by the Engineer Research and Development Laboratories. Here it is being used as a pile driver.

Morse-Starrett
WIRE ROPE CUTTER

CUTS WIRE ROPE



FASTER . . .
Especially designed cutting blade and dies assures fast cutting action. . . . . The hammer principle eliminates any special skill requirements.

CLEANER . . .
No jagged ends. The wire rope is cut with ends smooth and clean for perfect threading or splicing.

SAFER . . .
The enclosed cutting blade locked in the body of the cutter assures perfect safety.

and it's
PORTABLE . . .
Models for tool kit or stationary operation. With cutting capacities up to: 1 inch, 1 1/16 inch, 1½ inch.

SEE YOUR DEALER OR WRITE DEPT. "M"

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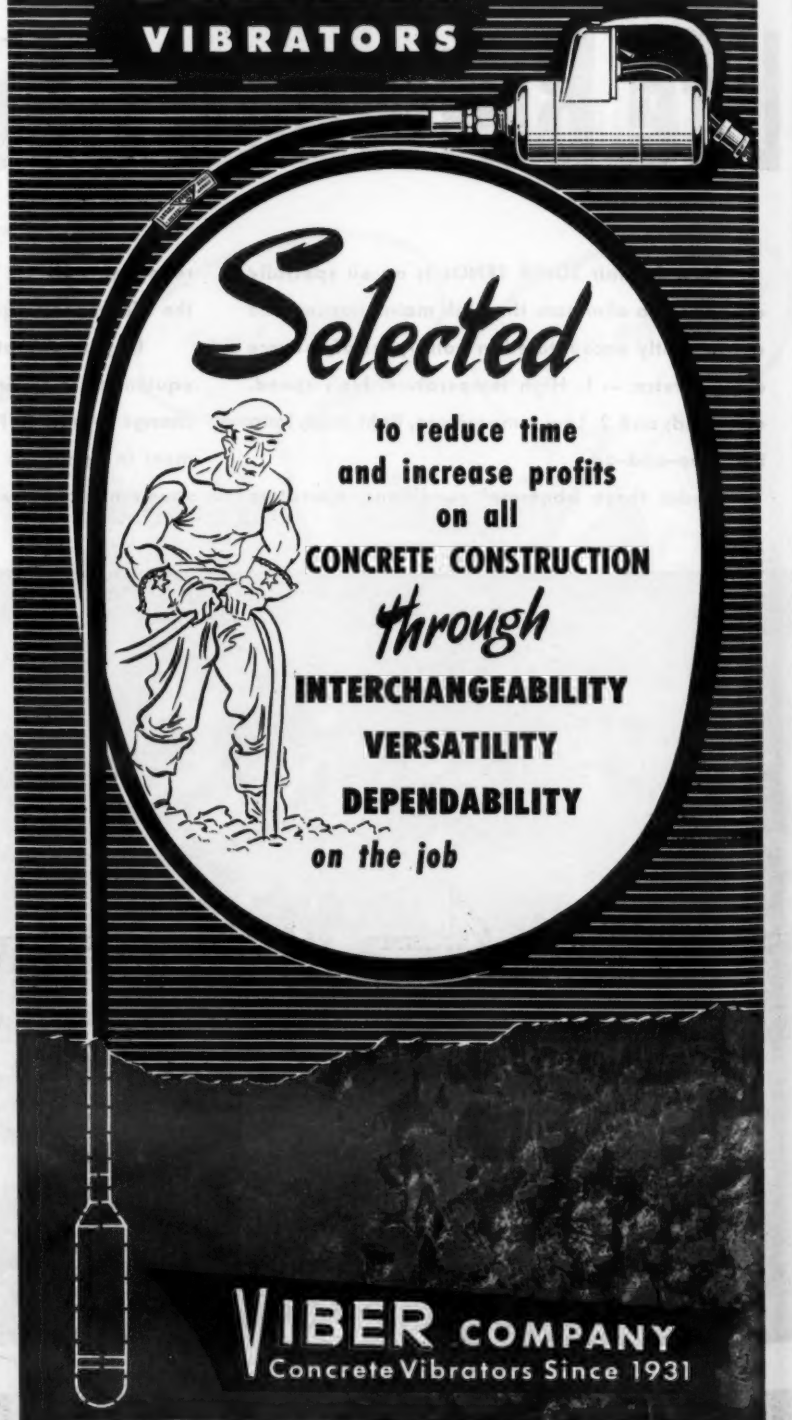

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Plant Boosts Power For 7-State System

Four-Unit Plant of Concrete And Steel Will Deliver Some 600,000 Kilowatts When It Is Completed in 1952

By WILLIAM H. QUIRK,
Eastern Editor

✦ ON the left bank of the Ohio River, 3 miles from New Haven, W. Va., the American Gas & Electric Service Corp. is constructing a four-unit steam-generating plant which will, when completed in 1952, provide 600,000 kilowatts of electric energy. Two of the four units, each of which has an output of 150,000 kilowatts, will serve the Appalachian Electric Power Co. The other two units are for the use of The Ohio Power Co. Both companies are part of a group of seven operating electric utilities making up the integrated power network known as the American Gas & Electric Co. System. This system serves more than 1,000,000 customers in seven states between Lake Michigan and the North Carolina border.

Construction of the big steel and concrete power plant got under way in July, 1947, when ground was broken for the excavation. By the end of 1949, unit 1 was on the line. Unit 2 will go into operation this year, with units 3 and 4 following in 1951 and 1952. The total cost of the four-unit plant is approximately $70,000,000. Sollitt Construction Co. of South Bend, Ind., is the general contractor. The 275-acre site, with 6,000-foot frontage on the river, was selected to permit future expansion, if necessary, to six units with a total capacity of 900,000 kilowatts.

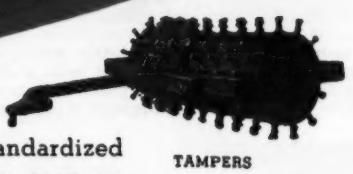
The Philip Sporn plant with its four units will be the largest plant in the system. It is centrally located in the network, with which it is connected by a new 4½-mile transmission line. Along the front, or north-south line that faces out to the tracks of the Baltimore & Ohio Railroad and the state highway, it measures 220 feet. The other way, from the office in front to the screen house at the edge of the river, the building is 378 feet deep. Half of the plant, housing units 1 and 2, was built first. The other half for units 3 and 4 adjoins the initial construction on the south. This latter extension is 88 feet less in depth, since the office wing does not extend the full front of the building. The office portion will be at the center when units 5 and 6 are added to adjoin units 1 and 2 on the north in the ultimate expansion program.

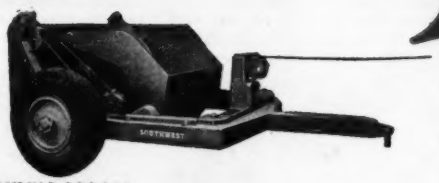
Excavation for Foundation

Beneath surface strata of topsoil and silt lies a deep bed of sand and gravel that provided solid bearing for the heavy foundation. No piles or caissons were required. A ballast or anchor mat of concrete, from 4 to 9 feet thick, was laid as a foundation. At the start of the site excavation, the earth-moving

(*Continued on next page*)

American Gas & Electric Service Corp. Photo
Excavating the foundation for the pump house of the Philip Sporn power plant in West Virginia. Morestrench wellpoints unwater the hole, which is on the left bank of the Ohio River. Sollitt Construction Co. is the general contractor on the job.


TAMPERS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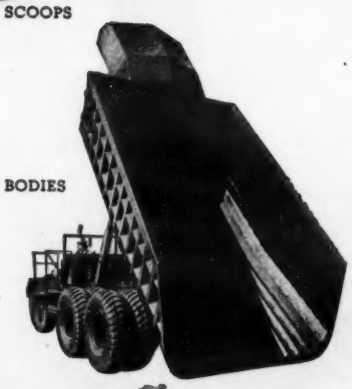
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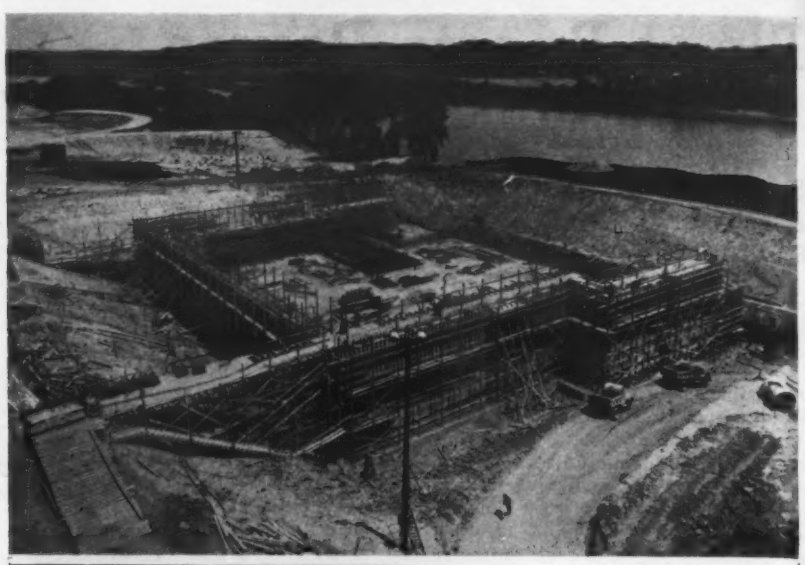
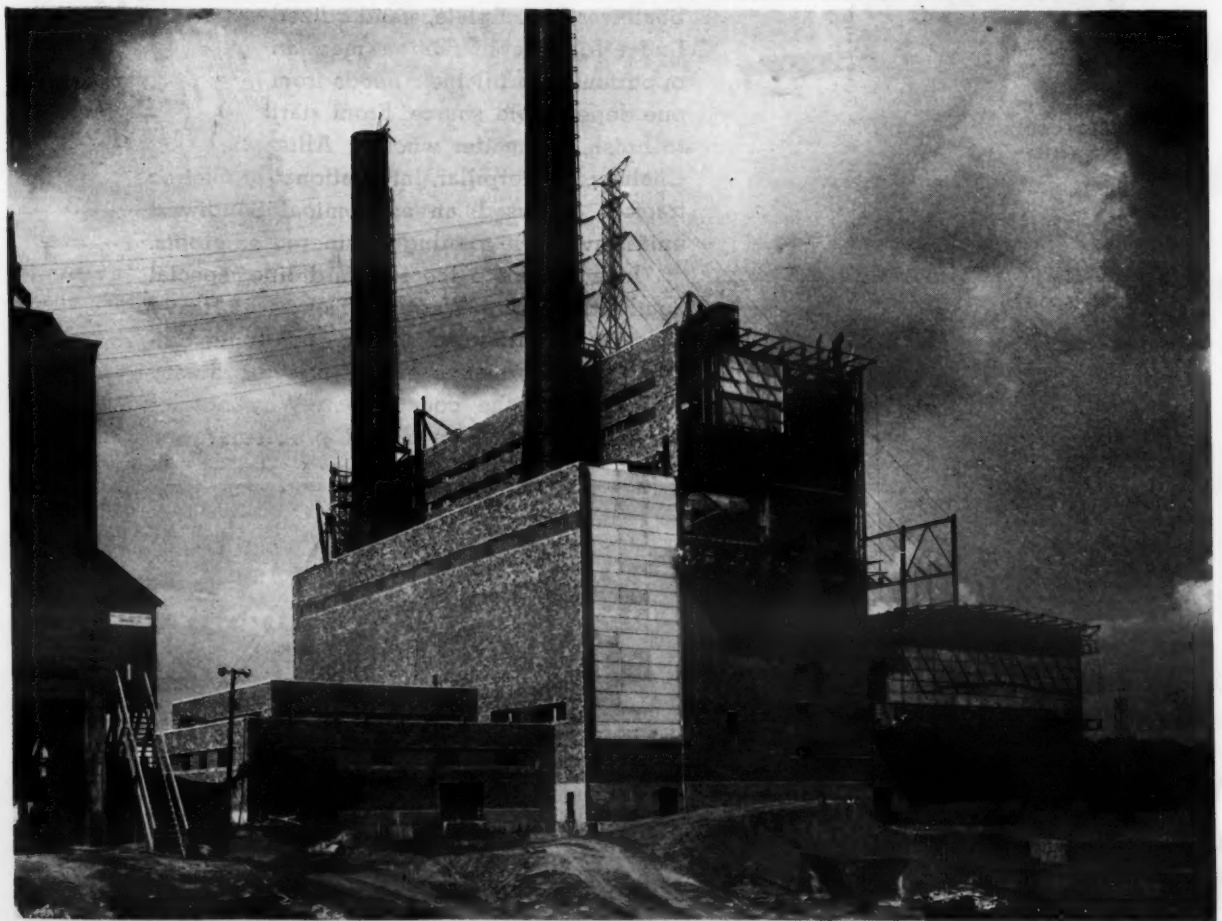
American Gas & Electric Service Corp. Photos

A protecting dike along the Ohio River, enclosing the foundation hole of the Philip Sporn power plant, is replaced with a cellular sheet-pile cofferdam (top). Below is the foundation slab for the pump and screen house, with the coffer in the background. Water at elevation 540 was such a problem that Moretrench wellpoints were installed.



American Gas & Electric Service Corp. Photos

These two views, top and bottom, show the foundation for the boiler-bunker bay and turbine room for units 1 and 2 of the plant. Forms for the exposed faces were ⅝-inch plywood, with 1-inch lumber elsewhere. Each of the four units will have an output of 150,000 kilowatts. Unit 1 is on the line now, unit 2 will go into operation this year.



American Gas & Electric Service Corp. Photo

Here they are, units 1 and 2, nearing completion. Above the first floor, the walls are orange iron-spot brick, 12 inches thick, on the inside, with hollow structural tile for exterior facing. The smokestacks are 194 feet high.

Plant Boosts Power For 7-State System

(*Continued from preceding page*)

equipment included two Heil 12 to 14-yard scrapers pulled by International TD-18 tractors, two 16-yard Tournapulls which were snatch-loaded by a Caterpillar D8 tractor, and three LeTourneau scrapers pulled by three Caterpillar D8 tractors. The excavated material was used to construct a protecting dike completely enclosing the hole and encircling the coal-storage and ash-disposal areas. From original ground elevation of 570, the dikes were built up in 6-inch sheepsfoot-compacted lifts to elevation 582, with a 20-foot-wide crown.

After going down 20 feet, the ground became too soft and wet for the motorized machines, so they were replaced with two Northwest 1½-yard draglines with 65-foot booms. When elevation 540 was reached (the river pool is at elevation 538), the water became such a problem that a Moretrench wellpoint system was installed with its 10-inch header line at that elevation. Risers 25 feet in length were sunk at 5-foot spacing, and the water was pumped out by 3,000-gpm pumps—two electric units on the line with two diesel units for standbys. Digging was resumed in the dry until elevation 524 was reached, when water was again encountered. A second-stage header line was installed at elevation 530 which permitted dry digging down to elevation 512. The header line discharged the water through the dike

(*Continued on next page*)

into the river.

In the meantime the dike along the river front was being replaced with a cellular sheet-pile cofferdam made up of eight 54-foot-diameter cells. Carnegie M101 and 112 sections in 63-foot lengths were driven to rock at elevation 507 by a McKiernan-Terry 9B3 hammer, used either by one of the crane rigs on land or by a derrick boat in the river. The cells were backfilled with material from the excavation, and a haul road was built over their tops. Once the cofferdam was completed, the earth dike was removed from the section along the river bank. Total excavation at the site was around 500,000 cubic yards.

Concrete Batch Plant

While the excavation was in progress, a concrete-mixing plant was set up on the site. A 200-ton aggregate batcher is on the top level above the floor holding two Smith 56-S 2-yard mixers. Batches are mixed for 1½ minutes, and then dumped into a hopper which discharges into dump trucks which drive underneath the tower. Cement is stored at one side in a silo 55 feet high x 8 feet in diameter, holding 500 barrels, and constructed of U. S. Steel 16-gage galvanized-steel pipe sections.

Air-entrained Type 2 Columbia cement was shipped in bulk from Zanesville, Ohio, to a plant siding of the B. & O. Railroad. Darex, air-entraining agent was also added to the mix to insure an air content of from 3 to 4 per cent. Sand and gravel for the aggregate was supplied by the Tri-State Materials Co. of Charleston, W. Va. Dredged from the Ohio River, the material was delivered to the job by barge and unloaded by a derrick boat into a hopper at the edge of the water. A series of Barber-Greene conveyors moved the aggregate up the bank into stockpiles.

A Barber-Greene loader filled 3 bottom-dump Euclids from the stockpiles. They hauled the sand and gravel about 700 feet to the plant and dumped their loads over a rail grating atop a hopper. A feeder at the bottom of the hopper moved the material to a long belt conveyor which raised it to the aggregate bin. Water from the wells was pumped into a supply tank at the plant, and from there was released into each batch. With the use of both mixers the plant has a capacity production of 100 yards of concrete per hour.

The dry weights of a typical 9-bag batch of concrete are as follows:

Cement	846 lbs.
Sand	2,274 lbs.
Small gravel, 1¼-inch	2,088 lbs.
Large gravel, 2½-inch	2,088 lbs.
Water	63 gals.
Darex	4¾ ozs.

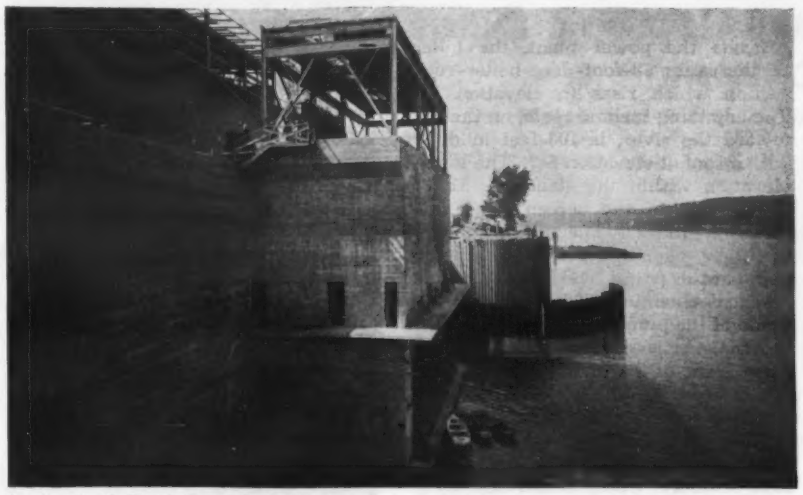
The slump of the mix did not exceed 3 inches.

Placing Concrete

At the plant the air-entrained concrete was discharged into a fleet of up to five dump trucks which carried 2 yards each. They hauled the material to the part of the structure being built, and unloaded the concrete into hoppers from which either buckets or buggies were filled. On the foundation work cranes emptied the buckets into the forms. On the thick mat slab, bulkheads were installed to hold individual pours to from 450 to 700 yards. The largest pour required 800 yards of concrete.

The mat is up to 9 feet thick, while the side foundation walls average 3 feet in thickness. The anchor slab took 3,680 yards of concrete alone. Concrete for units 1 and 2 totaled 45,000 yards, while units 3 and 4 require 35,000 yards. A lesser amount sufficed for the latter because of the common wall between the two portions of the building, and because units 3 and 4 have no attached office and machine shop.

Wooden forms were used in the construction—⅝-inch plywood for the exposed faces, and 1-inch lumber elsewhere. Backing consisted of 4 x 4 studs on 12-inch centers, and 2 x 6 double wales on 3-foot centers held by Universal ties. Carnegie-Illinois Steel Co. furnished the reinforcing steel, which totaled 3,700 tons for units 1 and 2 and 3,000 tons for units 3 and 4. As the concrete was placed it was vibrated with Viber electric vibrators; curing was done with water.



American Gas & Electric Service Corp. Photo

The screen house and discharge flume for units 1 and 2 of the Philip Sporn plant.

Concrete was poured in the foundation walls up to the level of the first floor at elevation 587, or 17 feet above the original ground level. The structural-steel framework, totaling 10,500 tons for the four units, was furnished and erected by the American Bridge Co., the material coming from its plant at Ambridge, Pa. Erection was done with the aid of cranes and two stiffleg derricks.

Superstructure

Above the first-floor level, the walls of the power plant are constructed of orange iron-spot brick, 12 inches thick, on the inside, and hollow structural tile for exterior facing. The Keagler Brick Co. of Steubenville, Ohio, furnished the brick masonry, and Patent scaffolding was used in the wall work. The power plant has floors of reinforced-

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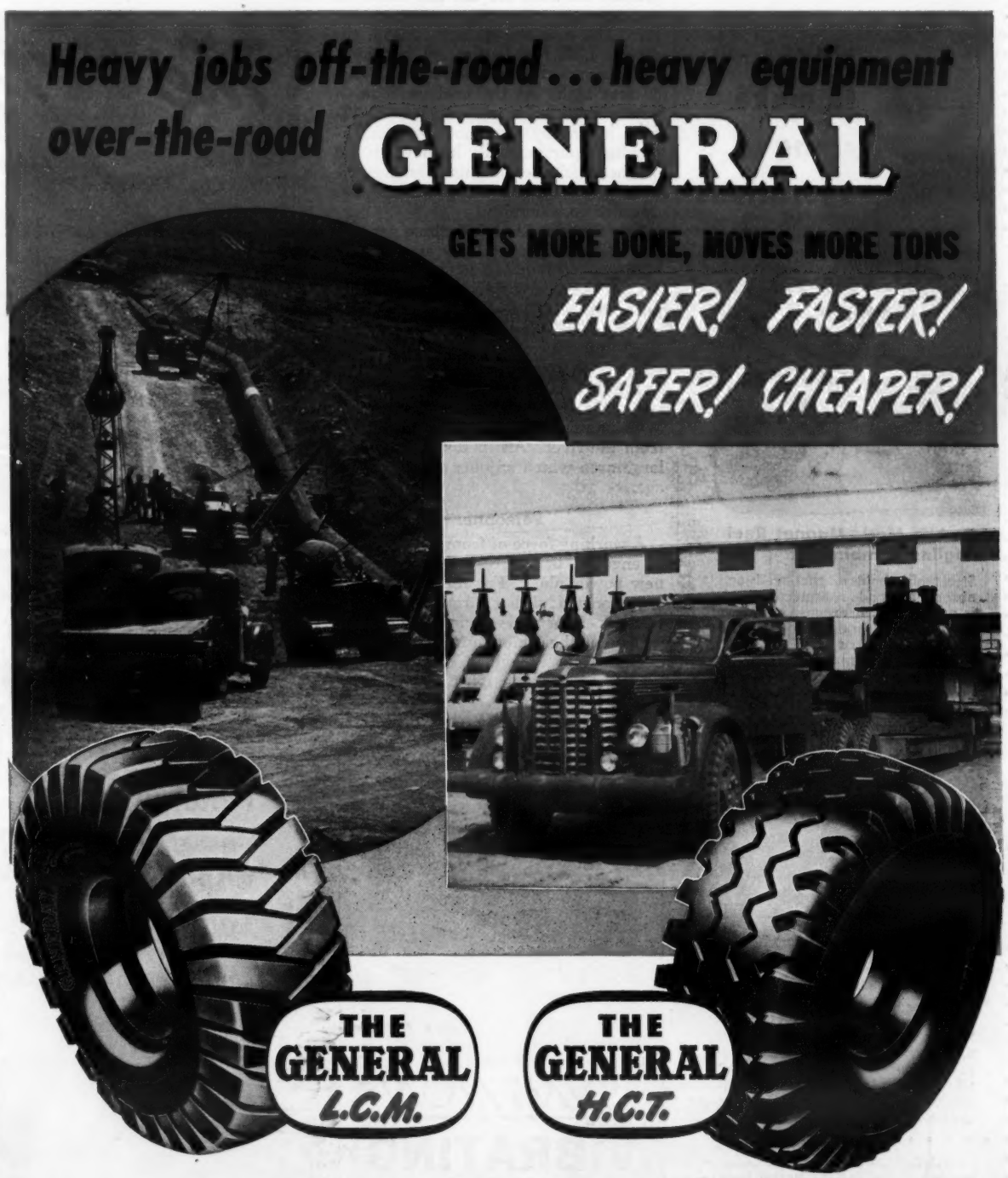

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SPECIFY GENERAL TIRES ON NEW EQUIPMENT

Plant Boosts Power For 7-State System

(*Continued from preceding page*)

concrete slabs at ten different levels.

For hoisting the concrete to the desired level, an Insley steel mast tower and two other frame towers were built at the sides of the structure; they were operated by two-drum hoists. The concrete was discharged into floor hoppers on each level, and distributed by buggies.

A part of the floor slabs and all of the roof was built of Robertson Q-type flooring which was covered with insulation and topped with a bonded 20-year slag surface course.

Above the bunker bay roof, which is at elevation 677 or 90 feet above the first-floor level, rise four smokestacks 194 feet high, their tops 284 feet above the ground. They are built of steel rings welded together to an 18-foot diameter and lined with Gunite, 1¼ to 2¼ inches thick.

Interior

Inside the power plant, the tallest portion is the 68-foot-deep boiler-room section which rises to elevation 720. The adjoining turbine room, on the side toward the river, is 100 feet in depth with a roof at elevation 647. The lowest elevation within the structure, 518, is the bottom of the screen house and discharge tunnel. The normal pool of the river, elevation 538, has a 20-foot depth at this point. The maximum flood reached elevation 590 which is the grade of the pump-house roof on which the transformers are located. The finished grade of the turbine-room floor is at elevation 587. The bottom of the condenser pit is elevation 539.5.

The Babcock & Wilcox boilers operate at 1,050 degrees F, 2,000-pound gage pressure, with a steam capacity of 1,000,000 pounds per hour. Each boiler burns 1,440 tons of coal a day. Coal is obtained from near-by mines and barged to the site; a company mine is also being developed within a mile of the plant. The Lehigh Structural Steel Co. of Allentown, Pa., furnished and erected the steel for the coal-handling equipment—conveyors, towers, chutes, etc. The coal-storage area within the dike is 1,200 feet long x 700 feet wide. It accommodates 1,000,000 tons in a pile 50 feet high. As the coal came in, it was spread and compacted in 6 to 12-inch layers by the motorized earth-moving equipment. By keeping air out of the stockpile in this manner, the hazard of spontaneous combustion was lessened considerably.

The General Electric turbine generators will revolve at 3,600 rpm on the high-pressure unit, and 1,800 rpm on the low-pressure side. They generate power at 13,800 volts, which will be raised to 132,000 volts for transmission. Each unit will require water at the rate of 100,000 gpm, or a grand total of 144,000,000 gallons of water per day for use in the Worthington condensers. Worthington pumps draw the water from the river. Ash is disposed of in a large area which adjoins the coal storage.

Personnel

A working force of from 1,200 to 1,400 is engaged in the construction of the new power plant. For the Sollitt Construction Co., Jules Biron is Superintendent. D. W. Parsons is Resident Engineer for the American Gas & Electric Service Corp., of which E. A. Kammer is General Construction Engineer.

These chaps are hunting for small cuts and bruised spots in their conveyor belt, on the theory that regular inspection and repair lengthen belt life. The conveyor operates in the Stearns Quarry rock-crushing plant of Material Service Corp., Chicago. C. P. Klein at right is Plant Superintendent and J. W. Rooney at left is General Superintendent. Rooney uses Flexco fasteners for strengthening the damaged spots as well as for joining the ends.

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A Hoe Front is now available for the D6 Hystaway, as well as the D7 and D8.

Back Hoe for Tractor

The D6 Hystaway ½-yard excavator for mounting on Caterpillar tractors may now be equipped with the Hoe Front, previously available only for the D7 and D8, according to Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. Other variations for the D6 include interchangeable crane, dragline, and clamshell fronts.

The Hoe Front can be installed on old or new equipment. Tractor mobility and dozer-blade use are fully retained with the attachment in place, says Hyster. Standard width of the new dipper is 33 inches, but for narrow ditching a 23-inch dipper is also available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 1.

Finish Coat for Concrete

A new concrete finishing coat designed to give a permanent, uniform, waterproof exterior finish to concrete surfaces has been developed by Speed Finish, Inc., Irvington Form & Tank Corp., 20 Vesey St., New York 7, N. Y., distributor. Speed Finish is applied in two coats, a bond coat to fill in the voids and smooth the surface, and a finish coat that is applied after all the concrete has been poured. The finish coat is put on by starting at the top of the wall or structure, and is designed to leave a uniform color over the whole.

Both coats are applied with a cork float, and can be the color of standard cement or approach the color of limestone, the company says. It is also possible to vary the texture of the finish from medium rough to smooth. The process can be used on interior walls to give a smooth surface that may be left natural or painted; or a special finish can be used on the interior walls and ceiling in lieu of plaster, Irvington says. This latter finish doesn't require a bond coat. The company points out that Speed Finish provides both a chemical and mechanical bond between the concrete and the finish. It may be applied to old as well as to newly poured concrete.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 119.

Use of Testing Sieves

A 56-page catalog called "The Profitable Use of Testing Sieves" is offered by the W. S. Tyler Co., 3615 Superior Ave., Cleveland, Ohio. It includes information on the use of testing sieves for the analysis of crushed and screened materials, with suggestions as to both laboratory and field equipment for shaking the sieves, taking and weighing samples, timing tests, and plotting and comparing results. The booklet also illustrates and details all of the products manufactured by the company for the analysis of fine and coarse aggregates. It gives additional information on Tyler woven-wire screen and screening equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 13.

Job Data on Stabilizers

A new 4-page 2-color folder giving complete job data on P&H soil stabilizers has been prepared by the Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis. Bulletin S-8 pictures P&H Single Pass Soil Stabilizers on road and airport work in many states and foreign countries. A large cutaway drawing with accompanying text explains their operating features. Condensed specifications are also included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 46.

New DeVilbiss Plant

The DeVilbiss Co., Toledo, Ohio, manufacturer of air-compressor outfits and spray-painting equipment, will establish a manufacturing plant in Somerset, Pa., to tighten cooperation with major suppliers and permit more rapid and economical distribution to customers.

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Record Crushing On 20-Mile Project

Crushing - Screening Set - Up Spews 5,400 Tons Per Shift As Contractor Boosts Job Into High Gear

✦ WHEN the New Mexico State Highway Department set a 350-day time limit on 20.2 miles of new construction between Lordsburg and Separ, the contractor was equally anxious to rush the job. In spite of the fact that almost 200,000 tons of flexible-base material must be produced for the big project on U. S. 80, Skousen-Hise of Albuquerque is turning it out at the rate of about 5,000 tons a shift. Several record days have seen 5,400 tons produced. That includes output from two plants.

A large crushing plant is producing 1-inch material for a leveling course, and ¾-inch rock for the asphaltic-concrete filler. The other production unit is a sizing plant. It delivers screened 3-inch-minus material for the ballast course.

Crushing Plant

The crushing plant is a Pioneer 46 VE semi-electric rig. Power is supplied by a Caterpillar D17000 diesel, which drives a 34-kva General Electric 220-volt dc generator. Flat belts off the same engine-generator shaft drive the jaw and roll crushers.

The pit is generally good, but the quantities of large crushable rock vary so much that frequent adjustment of the jaw crusher is necessary. That usually called for a plant shutdown in the past. Thus one of the unique features about the set-up is a field modification which Operator Carl Austin made on the jaw-crusher adjustment.

Austin rigged up a drive sprocket on the jaw adjustment, and geared it through a drive chain to a wheel on the operating deck near the screens. He can change the jaw now without shutting down the plant or putting a man in a dangerous spot.

The 46 VE has seen plenty of service since Skousen-Hise bought it in 1946. It crushed material for jobs at Cuba and Bloomfield, and did 15 miles on the "Top of the World Highway" near Gallup. All this was for the New Mexico State Highway Department. It has crushed a variety of material, from caliche to malapi.

Pit-run gravel is a very light, fluffy material, weighing about 2,300 pounds per cubic yard. The pit is situated in almost the exact center of the two-contract project, just west of the Continental Divide. Approximately 45 per cent of the raw material is being crushed to produce the 1-inch leveling-course material. The percentage is somewhat higher on 23,000 tons of hot-

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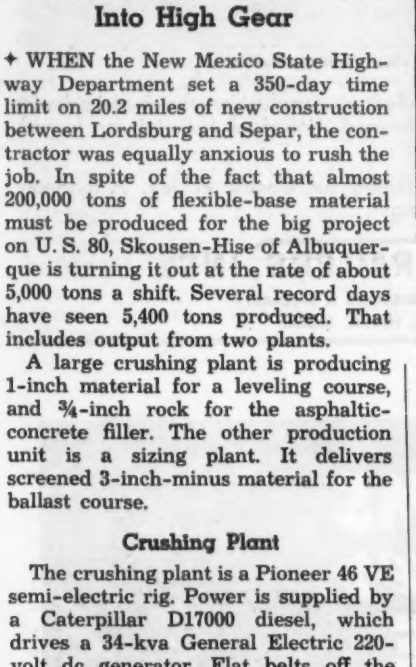
C. & E. M. Photo

Skousen-Hise set up this 46 VE Pioneer crushing plant for its 20-mile road job in New Mexico. A Northwest shovel feeds its hopper.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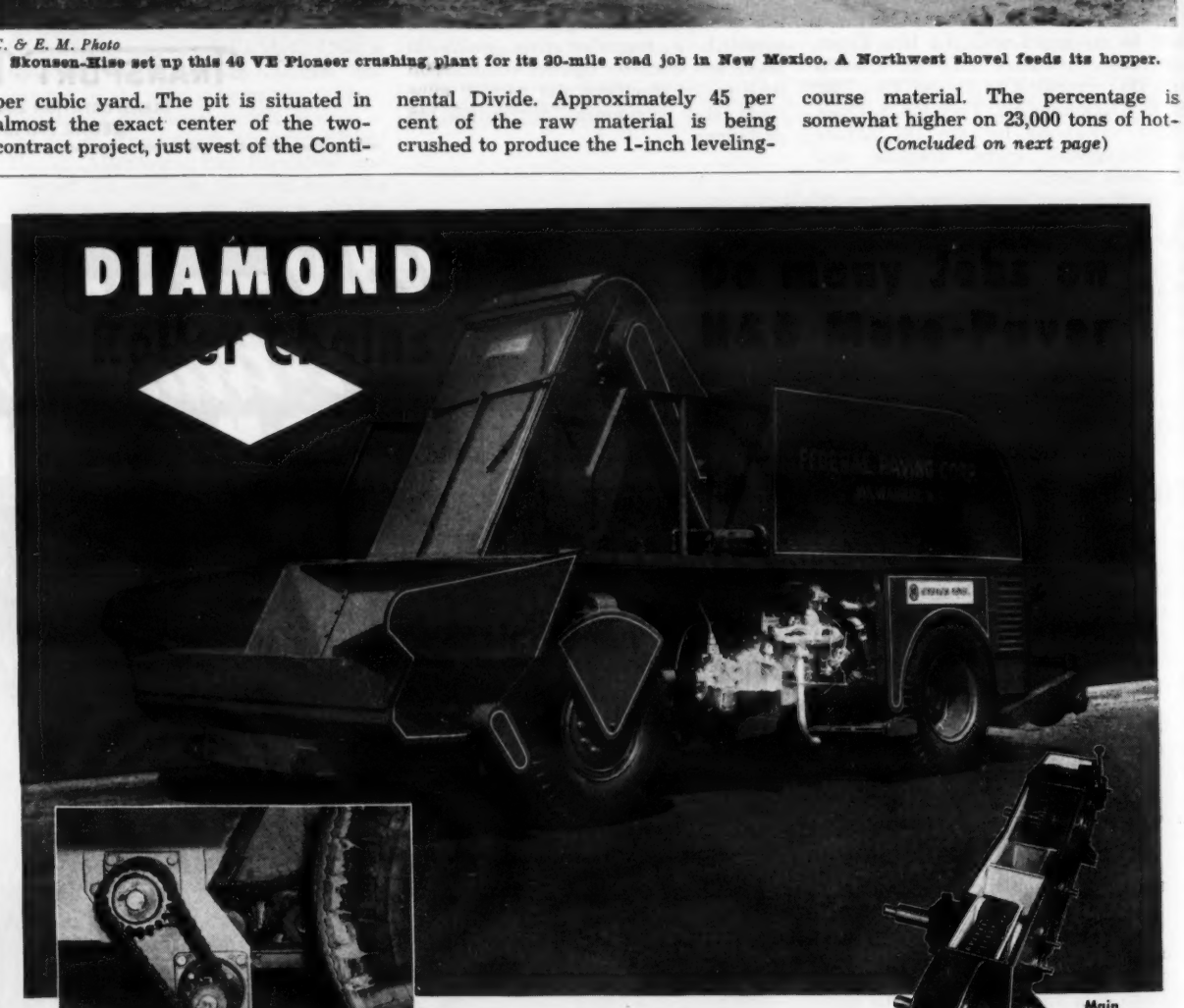
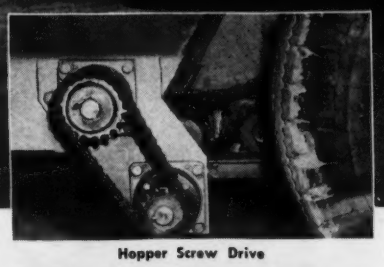
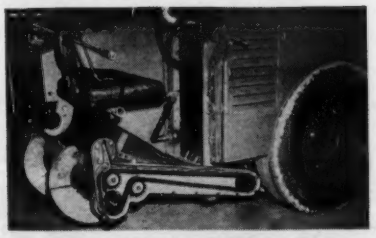
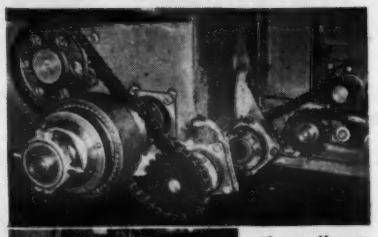




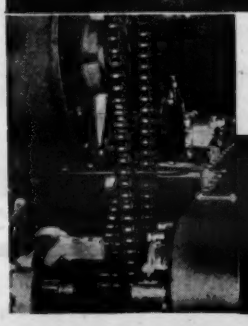
Hopper Screw Drive



Diamond Chains for distributing Screw



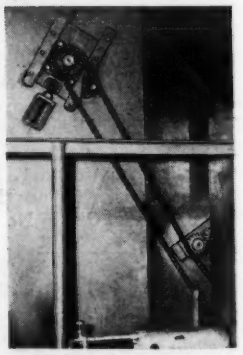
Above: Hopper Belt Drives.



Diamond Mixer and Feeder Drives.

Main Transmission

Below: Diamond Chain drives Feed Roll.



Elevator Drive

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On leading makes of machinery of this kind, like the Hetherington & Berner Moto-Paver, Diamond Roller Chains are used extensively because of their great reserve strength and long-life dependability. Six of these drives and the transmission are shown.

Such drives transfer power without slip or waste, and also give the engineer designer wide latitude in placement of shafts, —since center distances present no problem.

In laying out new equipment you, too, will find Diamond Chains will expedite design and manufacture, as well as assure maximum performance.

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mix mineral filler. That was stockpiled first, after the machine was set in its present location.

The plant is fed by a Northwest 1¾-yard dragline, either direct by casting into the feeder hopper, or with the help of two Koehring Dumptors. Feed and delivery belts are 30 inches wide. Return and reject belts are 24 inches. These, with the screens, are driven by electric motors. The jaw crusher is 10 x 36, and the rolls are 22 x 44.

The rig was producing 2,200 tons in 8 hours through a 1-inch screen when we visited the job.

Screening Plant

A small screening plant, which sizes ballast-course material, is the top producer. It takes pit-run material, scalps off the 3-inch plus, and delivers it at high speed to dump trucks.

Its output is heavy. A D8 Caterpillar and an Allis-Chalmers HD-19 both bulldoze at top speed to keep the trap filled.

The screening plant consists merely of a trap, feeder, conveyor belt, and a Cedarapids 3 x 8-foot vibrating screen deck with 3-inch mesh. The plant is driven by a Minneapolis-Moline engine. Throughs pass to a 21-ton surge bin, and dump trucks drive under to get their loads.

Dump trucks vary. Eighteen were used on a 5-mile haul. They were handling about 7 tons per load. The trucks dump according to directions from a state spotter. He has a chart showing exactly how much distance a load of any weight will cover.

Multiple Base Lifts

Processing of the crushed material follows standard New Mexico highway practice. On this job there is an average of 12 inches of compacted ballast course, which is placed in three 4-inch lifts. The ballast course is then covered by a 3-inch leveling course of 1-inch-minus rock. After this is placed, the upper 1 inch is mixed with asphalt, laid down, and covered by the hot-mix pavement.

Ballast and leveling courses in sections about 1,000 feet long are thoroughly bladed and mixed with moisture. Blading distributes the moisture and mixes the windrow. When a windrow is mixed and "moisturized", the grader cuts out thin sections. These are rolled by three pneumatic rigs: a Ford tractor with an Ingram roller, and a Farmall with two Tampo pneumatics.

Skousen-Hise has purchased a new Pioneer hot plant. It will be set up near Separ on the Southern Pacific railroad. Asphaltic cement will be shipped from California refineries.

The new highway has enough right-of-way to provide for future expansion when necessary. This pavement will be 24 feet wide, with 4-foot oiled shoulders and sub-base gravel extending 44 feet wide, shoulder to shoulder. The work is vitally needed, since U. S. 80 is on the "Southern Route", and transcontinental traffic is heavy.

The old highway is carrying automobiles and trucks near by, while the new route is being built. The old road will be torn up when traffic has been routed over the new pavement.

Personnel

The 20-mile job was designed and is being administered by B. G. Dwyre, State Highway Engineer, with W. E. Brown as Project Engineer. Andy Isbell is General Superintendent for Skousen-Hise.

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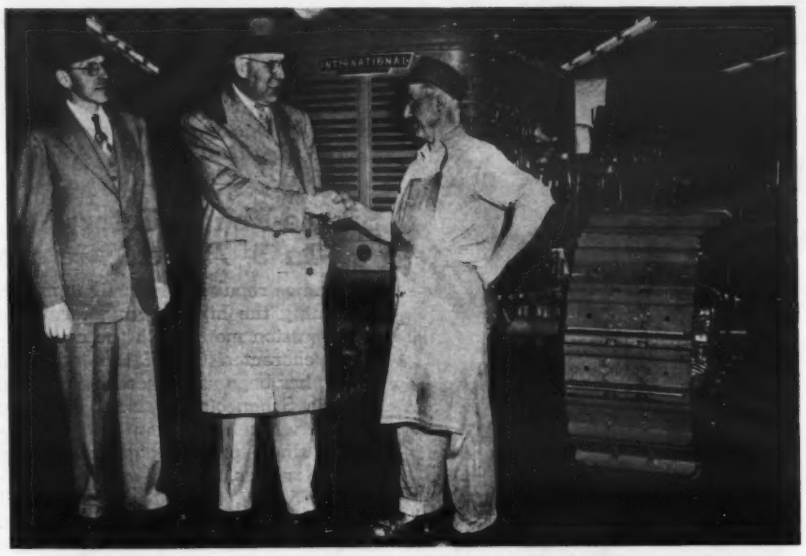

John L. McCaffrey, center, President of International Harvester Co., congratulates assembler and repairman George Stawiarski, right, on completion of the 100,000th crawler tractor, an International TD-18A, at the company's Chicago Tractor Works. Looking on at left is Leonard Stefanski, General Foreman.

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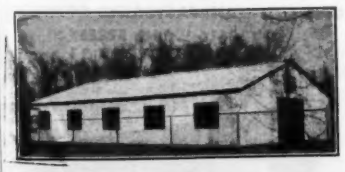

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301 Clay St., San Francisco 11, California, U. S. A.

The motor of the Bob-Cat electric cable hoist is totally enclosed within the cable drum for protection and to reduce dimensions and weight.

Hoists for Shop Use Have 5-Ton Capacity

A new line of heavy-duty electric cable hoists with lifting capacities from ½ to 5 tons is announced by The Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland 4, Ohio. The motor of the Bob-Cat hoist is totally enclosed within the cable drum to reduce overall dimensions and save weight. It is fully protected against weather, moisture, dust, and corrosive atmospheres.

Load-sustaining parts are made from steel forgings and castings that give the Bob-Cat a safety factor of over 6 to 1, the company says. The special high-torque Ohio motor and gears run in ball bearings. Gear reduction is accomplished by means of a double internal epicyclic gear train which incorporates two Weston-type load brakes. The motor brake is of the equalizing solenoid type connected to an up-limit cut-off switch. The load hook oscillates and swivels on roller bearings and is suspended on a 5/16-inch preformed plow-steel cable which can be replaced without disassembling any part of the hoist.

Designed for operation on 220, 380, 440, or 550-volt 3-phase 60-cycle current, these shop hoists are furnished with either pendant rope control or push-button control on pendant cable. A transformer in the electrical supply line cuts voltage at the control to 110 volts.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 58.

Single-Phase Motors In 5, 7½, and 10 Hp

A new repulsion-induction motor, combining the high starting torque of the repulsion motor with the constant-speed characteristics of the induction motor, has been announced by General Electric, Schenectady 5, N. Y. Designed for use where a constant-speed high-torque single-phase motor is required in large ratings, the new motor is available in 5, 7½, and 10-hp ratings, all 1,800 rpm. The 5-hp unit operates on 115/230 volts, while the other two use 230 volts.

According to G-E engineers, the new motor features high starting torque and low starting current with positive operation on low voltages, making it well adapted for severe starting duty. The motor is of the open (drip-proof) type, and is said to feature triple protection against physical damage, electrical breakdown, and operating wear. The ball bearings are mounted directly in the end shields of the new motor to provide good alignment between stator and rotor. Cooling is provided by a single large-diameter cast-aluminum fan.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 127.

Elementary Study of Soils: A Ready Reference, Guide

A ready reference and guide for soils men and for the engineer who has only a perfunctory knowledge of soils has been prepared by the Portland Cement Association, 33 W. Grand Ave., Chicago 10, Ill. The 76-page "PCA Soil Primer" serves as an excellent starting point for obtaining a workable knowledge of soils as they apply to the design, construction, and performance of portland-cement-concrete, soil-cement, and other types of pavement.

The primer defines soil terms, and describes tests commonly employed by soil technicians, but places particular emphasis on the practical meaning and application of these terms and tests. It directs its attention to pavements and makes no attempt to present a complete technical treatise on the detailed aspects of soil technology in relation to foundations for major structures. It discusses soil, its properties, identification, and classification. It treats soil surveys and sampling, and offers a resume of the bearing value of soils, along with examples of soil surveys, tests, and analyses. Tables, charts, and figures illustrate particular points and offer a fingertip reference for the field engineer.

This literature may be obtained from the Association, or by using the Request Card at Page 16. Circle No. 90.

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4727 N. 27th Street Milwaukee 16, Wis.

Care of Rural Roads Calls for Machines

Better Management, Better Choice and Use of Equipment Mean Better Maintenance of County and Local Roads

By H. A. RADZIKOWSKI, Chief, Maintenance Branch, Bureau of Public Roads

✦ IN the present mechanized era, the highway industry cannot afford to lag behind in the efficient mechanization of its work. Economical highway maintenance equipment has been and is being developed; in many areas, efficient use of it is made. In other areas, however, the available modern tools are not being utilized.

Today nearly one-third of all highway expenditure is directed toward the purchase, operation, and repair of motorized equipment. The effective use of these mechanical aids is an essential of any effort to improve and maintain the large mileage of local rural roads within reasonable cost limits.

Of some 3,000,000 miles of rural roads now existing, primary and secondary roads under state control embrace about 500,000 miles. The remaining 2,500,000 miles are classed as local rural roads. Of these, 95 per cent are under the jurisdiction of local governments and 5 per cent are under state control. About 52 per cent of the local-road mileage is unsurfaced, 38 per cent is surfaced with granular materials, and 10 per cent has dustless surfaces. Estimates indicate that an adequate level of maintenance performance on these local roads can be accomplished with an average annual expenditure of $500,000,000. It is therefore timely to consider the factors affecting efficient mechanization for the job ahead.

Who Maintains the Roads?

More than 18,000 local government units have some measure of jurisdiction over the extensive mileage of local rural roads of the country. These units are approximately as follows: 2,800 counties; 15,000 towns and townships; and 900 special districts. The road mileages they administer range from less than 5 to more than 5,000 miles. Their financial resources for road purposes range from annual receipts of $500 or less to more than $10,000,000.

There is actually little uniformity in the manner of carrying out the local-road function. The elected county governing body of officials or surveyors manages road affairs in about 1,050 of the 2,800 counties. In approximately 640 counties, road management is in the hands of a superintendent or supervisor appointed by the governing body. Appointed or elected engineers are in charge of road work in about 850 counties. More than 80 per cent of the county engineers are employed in 9 states and 90 per cent are employed in 12 states.

In approximately half of the 15,000 towns and townships, the governing body manages local road affairs. Supervisors are elected for this purpose in about 2,200 units. Appointed officers manage road work in 2,300 towns and townships, while engineers are appointed in about 150.

In some county areas, road maintenance is performed on all local roads by a single highway department under the county-wide direction of a county engineer. In others, the county maintains all roads but divides the county into smaller individual and independent units. In still other county areas, maintenance is performed by the county highway department on the more important roads, and within the same area the less important roads are maintained by separate townships and road districts—as many as seventy different highway authorities.

The provision of an adequate and competent maintenance organization that can be charged with the perpetuation of the investment in the roads is of the greatest importance. It will be recalled that one of the first objectives in the development of Federal aid in this country was the establishment of an adequate state highway maintenance organization. It is believed that the experience of the intervening years has proved the wisdom of this policy. This lesson should be kept in mind when considering the local-road problem.

Choice and Use of Equipment

Equipment should be selected and so managed as to obtain the lowest unit cost for construction and maintenance operations. This need is best met by the selection of multipurpose machines which can be kept in use during a maximum part of the available working time. Development in highway equipment, especially the motor grader, has greatly increased the range of an efficient maintenance crew, but the advantages of the newer equipment cannot be fully realized in operations of the smaller governmental units. The average township and small political subdivision must either use its own obsolete equipment or contract for maintenance services at rates far in excess of those experienced by governmental units of sufficient size to permit the effective use of a better equipment plant.

Division of maintenance jurisdiction directly affects equipment inventories. For example, in one county area, maintenance of 3,092 miles of road is divided among the state highway department, the county, 19 incorporated places, one city, and 41 townships. In this area, the state highway department has assigned eight motor patrols to the 1,220 miles of road it maintains, or one to each 153 miles of road. Only two of the 19 incorporated places owns a motor patrol,

(Continued on next page)

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In addition, Chrysler Fluid Coupling prevents engine stalling, reduces clutch wear, eliminates jolts and gear rattle, simplifies starting from standstill with excessive load, gives gradual oil-smooth acceleration—opens a whole new field of improved operation for gasoline-powered equipment. See your Chrysler Industrial Engine Dealer or write us. *Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.*

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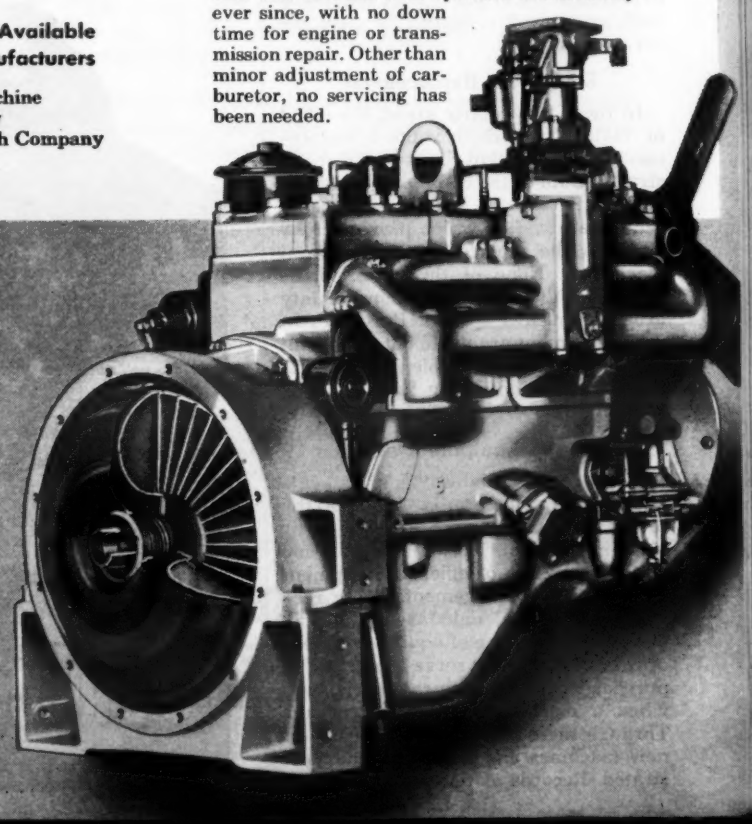

Chrysler gýrol Fluid Drive is built integral with Chrysler Industrial Engines. Its cost is only a few dollars more than the conventional flywheel which it replaces.

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Care of Rural Roads Calls for Machines

(*Continued from preceding page*)

one with 16 miles and the other with 11 miles of road. Thirty-two of the townships each own a motor grader, one for an average of 43 miles. One township owns four, an average of one per 11 miles of road. The rest own none, but hire from the other townships. The motor graders used by the state are busy practically all the available working time; those owned by the townships are idle about 60 per cent of the time. In all, 46 motor graders are owned in this area with divided maintenance jurisdiction, one for each 67 miles of road. The maintenance in this area is good.

In a second county area, where all of the 1,513 miles of roads are maintained under a single jurisdiction, one motor grader is assigned to each of 11 patrol sections which have 110 miles of road each. The six additional motor graders which the county owns are divided equally among three road-mix crews in the summer and are assigned to winter maintenance patrol sections during that season. These motor graders are operated 80 per cent of all available working time. In this county, 17 graders are owned, one for each 89 miles of road; that makes 33 per cent more miles per unit than in the first county with divided jurisdiction. The maintenance of the low-cost surface is equally good.

Shop and Storage Buildings

Another effect of divided maintenance jurisdiction is reflected in the necessary investment for equipment shops and storage buildings. One county, which has about 350 pieces of equipment with a 1949 book value of $630,080, maintains all 1,513 miles of road in the county. In another county, 1,638 miles of similar roads are maintained by the county, cities, villages, and townships, which have a combined equipment inventory with a 1949 book value of $426,707.

The first county area has an investment of $97,894 in a central shop equipped to provide all repairs and covered storage areas. The second county area has an investment of $414,116 in a central shop and numerous township and other local shops. In the latter case, duplication of facilities by different organizations is common within small areas. Moreover, since the work load in the county area is divided, no single organization except the county highway department could provide a repair shop sufficiently well equipped to meet the repair needs.

Equipment Replacement

In these two county areas, the effect of divided jurisdiction upon maintenance management is also demonstrated. Both of the county highway departments use a sound equipment-rental rate system which provides revenue for the replacement of worn-out machinery. None of the cities, townships, or villages in the second county area has such a system. Purchases of new equipment are made out of current capital assets, if available, and not out of a planned continuing fund accruing from rentals.

Adequate Equipment Records

Most county highway departments keep equipment records. Many of the towns and villages, because of their small size, do not. This, of course, is one of the requisites of efficient equipment selection and management. These records give factual data as to the efficiency of each piece of equipment. Records of performance serve as a guide in purchasing new machines and indicate when a machine should be replaced. Through these records, the efficiency of new machines and methods is demonstrated. Records of the one county, for example, showed that a group of large trucks, which had been purchased primarily for snow-removal duty, were operating at a loss under the established and reasonable rental rates, even though utilized to the maximum extent possible. With these facts available, the county commissioner had no difficulty obtaining approval of the county board to dispose of all these trucks.

The records of two groups of motor graders were watched by another county commissioner, who had adequate records to guide him. The machines in one group were 14 years old, while the others were from 2 to 4 years. Operating costs for the older machines were over 6 cents per mile greater than for the newer machines. Each machine traveled about 10,000 miles in 1949, so that each of the older machines was costing about $600 per year more.

Desirable Mechanization

After reviewing the wide variation

(*Continued on next page*)

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It's the new DoMor Elevating Grader that quickly gives your No. 12 or No. 112 Motor Grader the ability to cast, load or terrace with speed and economy. The grader is easily converted from blade to elevating work and back again.

If you're looking for a way to lower costs, see your nearby DoMor-"Caterpillar" Dealer for a convincing demonstration of the DoMor's amazing production capacity and economy!

Here are a few of the DoMor features:

√ Strong welded box section plow beam.

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√ 4-ply corrugated top conveyor belt.

√ Auger-type pan cleaner.

√ Operation controlled by regular grader controls.

√ Plus a score of others that your DoMor-"Caterpillar" Dealer is anxious to tell you about.

600 cu. yds. an hour were "cast" by this DoMor-"Caterpillar" team working on a township road. The same high production capacity is put to work, at left, loading berm trimmings.

ULRICH PRODUCTS CORPORATION

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that exists today in local-road maintenance operations, the questions naturally arise—What is a desirable status of mechanization? What are the yardsticks for efficient operation?

Surveys of maintenance operations reveal that a variety of generally accepted maintenance performance indicators are needed in connection with equipment management, to reveal the current relationship between selected factors of highway maintenance performance and cost.

Indicators have been designed to reveal the mechanical condition of equipment, and thereby enable one to determine the time at which individual units should be overhauled or discarded. These indicators are provided by various types of records, such as those showing oil and fuel consumption, frequency of the need for repairing, and the annual cost of repairs. However, there is a need for indicators of a different nature which might reveal the size, kind, and efficiency of the equipment fleet needed to preserve and operate a specific mileage of roads of a given type or types, under specific conditions. For example, how many miles of gravel-surface blading operations can be secured with a light, medium, or heavy motor grader, and what is the quality of maintenance resulting from each unit?

The aggregation of maintenance equipment for any road system should be designed to fit the tasks of that particular system, just as a building is designed to meet the needs of a particular tenant or community. It is necessary to sum up the needs for service in each highway administrative area, and to translate these needs into types, sizes, and quantities of equipment. It may be noted that this procedure entails the use of equipment performance criteria, and empirical rules for the integrating of patrols, gangs, and roving equipment.

Needs for Soil-Aggregate Surfaces

The mileage of soil-aggregate roads which can be maintained by a single mechanized unit varies with local conditions. Speed and frequency of operations are the chief factors which influence the number of individual units required for a given job load. Mileage per motor grader in the 11 counties listed in the following table varied from 82 to 148, and for 1½ to 2-ton trucks it varied between 68 and 517 miles per unit.

Indicator of Mechanization Needs For Soil-Aggregate Surfaces

County	Total Miles Maintained	Miles Maintained by Unit Motor Graders	Miles Maintained by Unit 1½-2-ton Trucks
A	403	80	107
B	460	92	230
C	326	82	82
D	626	82	109
E	645	130	134
F	462	115	154
G	533	88	88
H	940	134	188
I	253	84	63
J	963	107	241
K	1,034	148	517

An important variable that influences indicators of mechanization needs is the *frequency* of the maintenance operations, such as surface blading. Blading operations in six widely separated areas in six different states were studied. The operations of all highway departments in the area—state, county, and township—were included. The frequency with which gravel or soil roads are bladed in these areas is shown in the accompanying table.

Many factors — traffic intensity, soil conditions, climatic conditions, etc.—affect the frequency of this operation. The minimum frequency was 4 per year, the maximum was 156 per year, and the average for all six areas was 37 per year. The variation between the minimum and the average blading frequency in the areas studied was 33. Such a variation has a profound effect on equipment needs. In some areas of the country it is necessary to use local surface materials that are not the most suitable, and which require more blading, but there is also room for economy in the blading operations through a better understanding of the frequency with which a road should be bladed and in the selection of the most suitable types of mechanical units to perform good-quality work. The accompanying table shows the cost of blading soil-aggregate surfaces in various areas throughout the U. S.

Indicators of Equipment Use

After a determination has been made as to the amount of equipment necessary for the conditions in a particular county, the question frequently arises as to the relative economy of owning or hiring this equipment. The decision is particularly important in regard to those items that will not be used ex-

(*Concluded on next page*)

Cost of Blading Soil-Aggregate Surfaces in Various Areas Throughout the United States Year 1948

Area	Annual Frequency	Cost per Operation per Mile	Annual Cost per Mile
1.			
County A—all roads	26	$3.00	$ 78.00
County B—main roads	12	7.25	87.00
County B—side roads	4	7.25	29.00
State highway	156	2.18	340.08
2.			
Main county roads	50	2.85	142.50
Other county roads	25	2.85	71.25
3.			
Main county roads	35	2.60	91.00
Other county roads	15	2.60	39.00
State roads	35	5.25	183.75
4.			
County A—all roads	20	1.80	36.00
County B—main roads	50	2.08	104.00
County B—other roads	10	2.08	20.80
5.			
State roads	25	2.00	50.00
Main county roads	20	2.40	48.00
Other county roads	15	2.40	36.00
6.			
State roads	160	2.00	320.00
State-aid roads	30	1.67	50.10
County-aid roads	17	2.30	39.10
Township roads	5	3.70	18.50
Average	37	$2.54	$ 93.90

Over 350 companies are using display advertising this year in **CONTRACTORS AND ENGINEERS MONTHLY**, a total unmatched by any other monthly magazine in the field. Why do the majority of advertisers choose **C&E Monthly**? Summed up in one word the reason is "balance."

Balanced in circulation to cover the entire highway and heavy construction industry, **C&E Monthly** carries your sales message to all the important buying groups including: contractors, their superintendents, state and county highway engineers and commissioners, equipment distributors, specification engineers, major material producers, and others who influence and buy construction materials and equipment.

Balanced in editorial content to match the interests of the entire field, **C&E Monthly** presents practical articles (17 a month average) on highways, large buildings, excavations, bridges, tunnels, dams, and other types of heavy construction.

Four Major Points about C&E Monthly:

1. It carries more editorial material than any other monthly publication in the field.
2. It also carries a higher proportion of editorial to advertising content.
3. C&E Monthly carries more display advertisers than any other monthly, and,
4. More exclusive advertisers.

C&E Monthly Editors spend over two-thirds of their time on location, personally visiting construction projects, and talking with contractors and engineers. Their staff-written articles are built around the unending search of practical construction men for increased job efficiency and lower construction costs.

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Small wonder, then, that so many firms choose **C&E Monthly** as their "pivot publication" on which to build an advertising schedule according to their special needs. Small wonder too, that throughout the great construction industry there is a fast-growing realization that to readers and advertisers alike **CONTRACTORS AND ENGINEERS MONTHLY** offers much for all, more for most, most for more.

the NEWSpaper of highway and heavy construction

470 Fourth Ave., New York 16, N.Y.

Care of Rural Roads Calls for Machines

(*Continued from preceding page*)

tensively. The table below shows the average hours that equipment was actually operated to date and the average hours of operation per year. This table is an example of usage in one area and does not represent a country-wide average.

It will be noted that motor graders were operated about 1,400 hours per year, well over half of the available working time. This relatively high percentage of use is due to the fact that, in the area studied, the graders are used as snow plows. The trucks, light and heavy, are used only 500 or 600 hours per year. This seems to be a relatively low percentage of use. The seasonal equipment, such as snow plows, road rollers, and oil distributors, are used about 200 hours per year.

The development of indicators of use on all equipment, with adjustment factors for surface type maintained, surface condition, climate, etc., and the correlation of these indicators with the rental cost of available rental equipment, will assist materially in determining the correct practice. One maintenance organization has decided after careful study of this problem that it can only afford to own and operate a motor grader if it uses that unit more than 900 hours per year.

Direction of Maintenance

Along with the criteria or factors for the proper design of an equipment fleet, there is also the problem of efficiently directing and communicating with that mobile fleet while it is actually operating. To accomplish this purpose, some counties have installed short-wave radio to secure closer coordination of maintenance operations and thereby reduce costs. For example, only one man is needed on snow-plowing trucks equipped with radio, where two have always been used for safety. A county commissioner is no longer held to his desk to answer calls. He can go out to the jobs, furnish direct supervision, and still be available via his radio. He is better informed, he can coordinate activities more closely, and the result is greater efficiency and lower costs.

Cumulative and Annual Equipment Usage

Type of Equipment	Number of Units	Average Age Years	Average Accumulated Hrs. Operated per Unit	Average Annual Hrs. Operated per Unit
Motor graders (32 bhp and less)	12	18.4	24,258	1,318
Motor graders (over 32 bhp)	30	6.6	9,528	1,444
Trucks (1½ tons)	23	8.7	5,508	633
Trucks (2 tons and over) rwd	34	7.6	5,889	775
Trucks (3 tons and over) fwd	10	11.0	5,379	489
Rotary snow plows	2	6.5	3,694	568
Tractors (light wheel)	19	4.1	3,017	736
Tractors (medium wheel)	9	15.9	13,890	874
Tractors (light crawler)	1	18.5	10,940	591
Tractors (heavy crawler)	7	10.1	7,921	784
Blade graders	2	12.0	6,842	570
Elevating graders	2	4.5	1,197	266
Snow plows (light duty, V type)	21	9.1	1,880	207
Snow plows (heavy duty, V type)	11	8.4	1,706	203
Snow plows (one-way truck)	1	12.5	343	27
Scrapers (7-8 cu. yds.)	4	5.7	3,895	683
Tank-car heaters	5	5.5	1,832	333
Oil distributors (truck)	2	6.5	2,107	324
Oil distributors (trailer)	9	6.3	1,111	176
Planers	3	17.8	15,059	846
Road rollers	5	7.5	1,289	172
Snow plows (motor grader, V type)	6	7.0	1,154	165

From a paper presented at the 47th Annual Meeting of the American Road Builders' Association, Cincinnati, Ohio, March 6-9, 1950.

Va. ARBA Director Dies

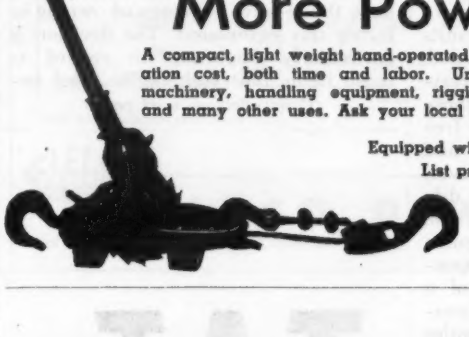
Funeral services were held on July 4 for Sterry J. Mahaffey, 46-year-old Engineer-Director of the Virginia Road Builders' Association, who died in Baltimore on July 1. He fell ill while he was attending a meeting of the Board of Directors of the Contractors' Division of the American Road Builders' Association in Washington.

The Original and Only

"More Power Puller"

A compact, light weight hand-operated tool for heavy duty use, will cut operation cost, both time and labor. Unexcelled for construction use, moving machinery, handling equipment, rigging, pulling stumps, laying pipe lines and many other uses. Ask your local Dealer for demonstration.

Equipped with 20, 30 & 40 ft. of cable
List price $27.75 to $33.80



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Newark, Ohio

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NAYLOR PIPE

Once you work with Naylor Pipe, you'll know why so many contractors depend on it.

No other light-weight pipe can give you Naylor performance because no other pipe has the exclusive Naylor Lockseam Spiralweld structure. This difference adds up to pipe that is extra strong and safe, easy to handle and install—pipe that gives you *plus* value right down the line.

Job-prove these Naylor advantages for yourself. Whether it's pipe for high or low pressure air and water, de-watering and drainage, dredging, hydraulic sluicing, sand and gravel conveying or other service, you'll do better with Naylor.

Sizes from 4 to 30 inches in diameter, lengths up to 40 feet, thicknesses from 14 to 7 gauge. All types of fittings, connections and fabrication.

NAYLOR PIPE COMPANY
1270 East 92nd Street, Chicago 19, Illinois
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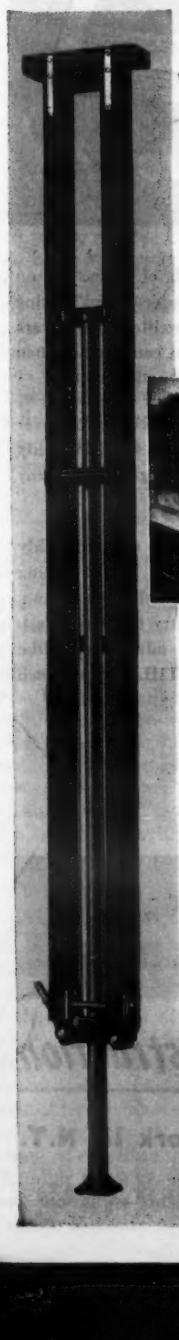
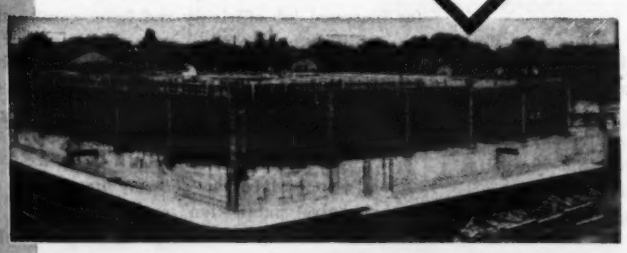


√SAVINGS √SAFETY √SPEED

ROOSHORS and ROOS Column Clamps



● On countless buildings throughout the nation . . . large or small . . . Rooshors have effected great savings in time and material over outmoded 4 x 4 shoring. Rooshors are readily handled by one man—transporting, setting, releasing and moving to a new location. They are instantly adjustable within their three ranges of sizes: 8 ft. to 14 ft., 7 ft. to 13 ft., and 5 ft. to 9 ft.—higher stories are shored with Roos Extension Shores:

Roos Column Clamps—the foolproof clamp—save countless manhours. Each clamp is identical to the other and it is *impossible to put them on wrong* . . . they have no loose parts and a hammer is the only tool needed to tighten.

Rooshors and Roos Column Clamps are available for rental or purchase from warehouse stocks from coast to coast.

Write today for Bulletin 352

BAKER-ROOS, INC.
602 WEST McCARTY STREET
INDIANAPOLIS 6, INDIANA

A Dual-Lane Bridge Spans River and RR

Carries U. S. 12 on Jackson, Michigan, North Belt By-Pass; Concrete Beam and Column Piers for 652-Foot Span

(Photo on page 1)

✦ THE Michigan State Highway Department has advanced the Jackson North Belt Route, relocating U. S. 12, with the completion of a 652-foot vehicular bridge spanning the Grand River and the tracks of the New York Central and Grand Trunk Western railroads. Part of a new by-pass, 0.2 mile north of the Jackson city limits, the bridge got under way in April, 1949, after the Department awarded a $588,414 contract to Jutton-Kelly Co. of Dearborn, Mich. Due to the steel strike, structural steel failed to arrive on schedule, so the contract completion date was extended to July 1, 1950.

Built over the marshy flats of Grand River valley, the structure consists of seven reinforced-concrete beam-and-column-type piers and two cantilever-type abutments supporting a plate-girder superstructure. Design loading is H20-S16-44. The 7½-inch concrete deck includes two 29-foot clear roadways separated by a 4-foot median strip, and flanked on the sides by 4-foot walks. Span lengths range from 75 to 92 feet. Pier heights are from 35 to 50 feet, measured from bottom of footing to crown of roadway. The abutments average 14 feet high.

Abutment A is at the west, and abutment B at the east end of the bridge, with the 7 piers numbered from west to east. The longest span, 92 feet, crosses the river between piers 1 and 2. Tracks are located under all spans from pier 5 east. The two abutments and five of the piers are supported on 12-inch 74-pound steel H-piles driven to 40-ton minimum bearing. The other two piers, 1 and 2, are founded on rock. Cofferdams for piers 1 and 2, the river piers, were included in the contract. Cofferdams were also constructed at all the other piers except 3. A temporary work bridge was built across the river about 90 feet north of the highway to serve both the bridge contractor and the road contractor; the latter used it for dirt hauling on adjoining grading operations.

Sheet-Pile Cofferdams

Cofferdams for constructing the pier footings in the flat wet lowlands were built with Carnegie M-116 sections, 36 pounds per foot, in 10 to 25-foot lengths. These were furnished by the State and were left in place at the piers adjacent to tracks, and at a 60-inch-diameter sewer line close to abutment A. Sheeting to be pulled was supplied by the contractor. Such sections were Bethlehem AP-3. Sheeting was driven by a McKiernan-Terry No. 7 hammer handled by a 3000A Manitowoc Speedcrane with a 70-foot boom. The same rig also drove the steel H foundation piles with a Vulcan No. 1 hammer. Steel 56-foot leads were used on the H-piles, but the sheeting was driven without leads. Two portable boilers were available for furnishing the steam—a Broderick 110-hp and an Industrial 50-hp.

Piers 1 and 2, at the edge of the river, had the deepest cofferdams. These structures went down 9 feet below the surface of the water and were braced with timber rings. Concrete seals were required only at these two piers, their depths being 2 feet and 1 foot at piers 1 and 2 respectively. A large assortment of pumps was on hand for unwatering the cofferdams; it included a Chrysler 4-inch, Marlow 3-inch, Rex 4-inch, 2 Homelite 3-inch, and 2 Rex 2-inch pumps.

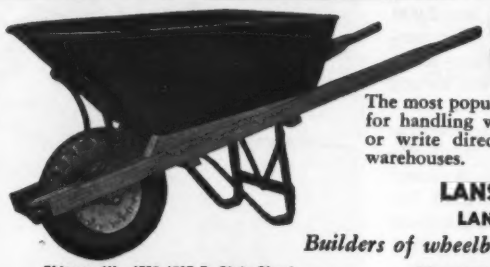
Two other Manitowoc Speedcranes were on hand for excavation work, pouring concrete, or aggregate handling at the batch plant. A 2000B unit with a 55-foot boom did most of its work at the piers, while a 1500 rig with a 45-foot boom saw service around the plant. In excavating, Owen 1 and 1¼-yard clamshells and a Page 1-yard dragline bucket were used to advantage.

Both abutments were built on fills that had previously been placed by the road contractor working on the adjoining sections of dirt embankment. Foundation piles were driven through these fills. The foundation piles were also supplied by the State so as not to delay the project while waiting for delivery. They were purchased the previous winter from the Carnegie-Illinois Steel Co.

Concrete Plant

In the meantime a concrete batch plant had been set up near the site, consisting of a Johnson 55-yard aggregate storage bin and a Butler 640-barrel cement bin. Peninsular air-entrained cement was hauled by truck in bulk quantities 15 miles to the site from the Consolidated Cement Corp. plant at Cement City, Mich. The sand and gravel aggregate was also delivered by truck after a 30-mile haul from the Cheney Gravel Co. at Holt, Mich. Concrete 5½-bag batches were hauled to the structure being poured in two or

(Concluded on next page)



LANSING F4-½ WHEELBARROW

The most popular wheelbarrow on the market for handling wet concrete. Ask your dealer or write direct to Lansing or one of our warehouses.

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LANSING, MICHIGAN

Builders of wheelbarrows for over 68 years

Chicago, Ill., 1535-1537 S. State Street
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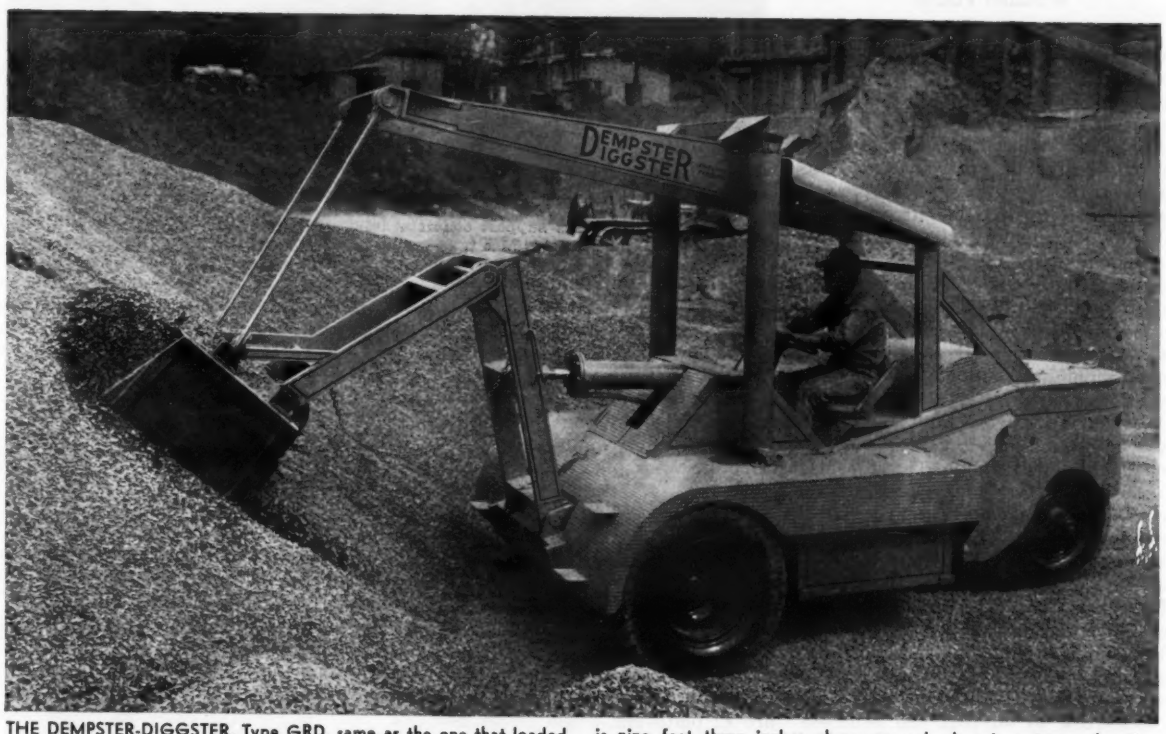
San Francisco, Calif., 338-348 Brannan Street
Boston, Mass., 78 Cambridge Street
New York, N. Y., 28-30 Vandam Street



THE DEMPSTER-DIGGSTER, Type GRD, same as the one that loaded 600 tons of stone recently, has a 15 foot six inch turning radius, is 20 feet long when bucket is in traveling position, and bottom of bucket is nine feet three inches above ground when in extreme dumping position. It will dig 15 inches below grade and through a 15 foot bank. Note how bucket follows the slope of the material.

THIS DEMPSTER-DIGGSTER, Type HL, is specially equipped for high dumping. The bottom of the bucket is 13 feet six inches above ground. It will dig through an 18 foot bank.

FOR FAST, EFFICIENT operation in difficult terrain, the Dempster-Diggster is available with crawler-type traction.

Fast Automotive Shovel Loads 600 Tons of Stone in Half a Day

CONTRACTOR REPORTS: HYDRAULIC CROWD, HOIST UNIT "FILLS LONG NEEDED PLACE IN OUR INDUSTRY"

THE DEMPSTER-DIGGSTER, a revolutionary shovel loader, recently loaded 600 tons of broken stone in the first half day of operation. This outstanding performance was reported to Dempster Brothers, Inc. by W. E. Lambert, president of Lambert Brothers, Inc., one of the nation's largest crushed stone contracting firms.

"In connection with our extensive activities in several southern states," the contractor said, "we have used various types of power shovels and front end loaders. After seeing the easy operation of the hydraulically operated Diggster in a demonstration we had made alongside of a competing loader, we placed an order with you. We installed the Diggster equipped with a yard and half stockpile bucket on one of our operations in western North Carolina.

"Our records show," he continued, "that the unit loaded approximately 600 tons of broken stone in the first half day of operation. The Diggster has been working continuously and is giving perfect satisfaction. It is a pleasure for us to so advise you because in our opinion the Diggster fills a long needed place in our industry. We welcome you to bring any interested parties to our operation to see the Diggster in action."

The tremendous speed of the Dempster-Diggster in excavation and stockpile work is accounted for, mainly, by its exclusive independent hydraulic crowd and hoist action, the hydraulic steering, and wheel-type traction, which permits truck speeds to and from jobs. The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver easy, fast, finger-tip control.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and 1¼ cubic yard (heaped) capacities; materials handling buckets in 1½ and 2 cubic yard (struck) capacities.

Complete information and prices may be obtained by writing the manufacturer, Dempster Brothers, Inc.

DEMPSTER DIGGSTER

DEMPSTER BROTHERS
480 Shea Bldg.
Knoxville 17 Tennessee

A Dual-Lane Bridge Spans River and RR

(*Continued from preceding page*)

three trucks holding 2 batches each.

Most of the concrete was mixed in a Ransome 34-E paver, with two other Smith 27-E units also available for mixing. These were stationed at the pier or abutment being built, and were supplied with water hauled in tank trucks. The water, tapped from city hydrants, was transported in 2,000, 1,500, and 1,000-gallon units. The concrete was discharged into Blaw-Knox 1 or 2-yard buckets which were swung over the forms by the cranes.

The air content of the concrete was between 3 and 6 per cent, with the average around 4 per cent. Average slump was 2 inches. The mix took 5½ bags of cement to the yard. The typical batch weights per bag of cement were as follows:

Cement	94 lbs.
Sand	212 lbs.
Gravel	373.6 lbs.
Water	48.6 lbs.

Wooden Forms

Footings for the piers averaged 78 feet long x 14 feet wide x 2½ to 3 feet deep. On top of these are the 4-foot-square columns, five to a pier. The beam caps on top are 5 feet deep x 4 feet wide. After the footings were poured, the rest of a pier structure was built in three operations. Concrete was placed first to mid-height in all 5 columns. Forms were then erected for the remainder of the columns and the cap on top. A construction joint was placed 4 feet 7 inches off one side of the center line of the middle column. Concrete was then poured, first in one of these remaining sections and then in the other.

Wooden forms were built of ¾-inch plywood backed with 2 x 6 studs on 12-inch centers and double 2 x 6 wales whose spacing varied from 24 to 30 inches. Superior Concrete Accessories form ties were used. Panels were prefabricated to a large extent in the carpenters' yard which was equipped with a Delta band saw, a DeWalt swing saw, and 2 Mall chain saws.

Personnel on the form erection and concrete placing worked from Safway steel scaffolds. These were used later as falsework to support the concrete beams between the columns for the full curing-out period after the wooden forms were removed. The tubular steel sections came in 3 and 5-foot lifts, well cross-braced for strength, and were jacked up from timber blocks on the ground to exact position under the beam caps.

C. & E. M. Photo
Safway steel scaffolds support concrete finishers working on the Jackson, Mich., by-pass bridge. The scaffolds also take the place of falsework to support the beam forms.

Reinforcing steel for the concrete was supplied by the Bethlehem Steel Co. from Lackawanna, N. Y. As the concrete was placed it was vibrated with Viber vibrators. Curing was with wet burlap. All exposed surfaces of the concrete were rubbed with Mall electric grinders powered by Jackson 2-kva electric generators.

Structural steel for the superstructure was supplied by Bethlehem, and was delivered by rail to the tracks going under the new bridge. Cranes unloaded the steel and erected it. The stringers are 12 plate-and-angle girder sections, 4 feet 2½ inches deep; they also served as supports on which the wooden deck forms were hung for the slab pours. After the first deck span was poured with crane and bucket, the paver was moved from the ground to the superstructure for the remainder of the concrete work.

Quantities and Personnel

The major items in the bridge contract included the following:

Unclassified excavation	2,694 cu. yds.
Steel sheet piling, left in place	4,013 sq. ft.
Steel foundation piles, driven	8,930 lin. ft.
Concrete substructure	2,592 cu. yds.
Concrete superstructure	1,488 cu. yds.
Cement	5,840 bbls.
Steel reinforcement	643,237 lbs.
Structural steel	2,370,000 lbs.
Rubbed surface finish	29,831 sq. ft.

Jutton-Kelly Co. employed an average force of 40 men on the project under the direction of Sid Wagner, General Superintendent; Joseph Ready, Superintendent; and Merritt E. Johnson, Engineer.

The Michigan State Highway Department was represented by G. M. Foster, Bridge Engineer; Rodney W. McClish, Project Engineer; and Andrew Severn, Inspector. The Department is headed by Charles M. Ziegler, Commissioner. Harry C. Coons is Deputy Commissioner and Chief Engineer.

Cable for Scraper Service

As part of its program of recommending one particular construction of wire rope to meet a particular purpose, the American Cable Division of American Chain & Cable Co., Inc., Wilkes-Barre, Pa., has recently issued a 4-page bulletin describing the cable it recommends for scraper service: Streamlined Scraper Rope at a 6 x 25 Type B flattened strand . . . Tru-Lay preformed . . . improved-plow steel . . . Lang-lay . . . independent wire-rope core. This rope, the company claims, will result in greater man and machine efficiency, with more dirt handled and longer rope life.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 157.

INGERSOLL SHOVELS

...Edges won't split or curl!

We guarantee this if you make sure to specify . . . INGERSOLL SHOVELS

The Special Tillage Steel, known as TEM-CROSS, used in the manufacture of all Ingersoll Shovels, was developed in our own steel mills. By cross-rolling and special heat-treating, we give this steel an interlocking, mesh-grain structure that resists splitting.

Inquiries are invited

INGERSOLL STEEL DIVISION
Borg-Warner Corporation
New Castle, Indiana

All Blade Finishes remain Black finish, except Shovels and Spades in Alloy, A and B Grades, which may be furnished with face polished and velvet back, or full polished.

INGERSOLL SHOVELS
"A Borg-Warner Product"

in Dredging it's the solids pumped --- that counts!

Eagle "Swintek" Dredging Ladders get the Solids!

YOU can't sell water—it costs money to pump it—it's the sand and gravel intake that counts. Put an Eagle "Swintek" unit on your dredge and watch the ratio of solids to water zoom up! The digging chain passes over an arcuate track at the end of the dredge ladder, hugging the intake nozzle, shielding it against boulders and logs—prevents clogging and abuse to pumps. The cutters chop loose impacted aggregate and get it into suspension so the pump can "do its stuff." Clay and silt are churned away from pumping zone. An even flow of material to shore plant is assured.

Above: E. T. Slider Co., Louisville, Ky., Ohio River dredge No. 5 equipped with 15"—75' heavy duty "Swintek." Double side braced for heavy river bar dredging conditions. This highly sucessful producer has used "Swinteks" for nearly 20 years.

It is not uncommon to increase dredge output 400% or more. Many dredging operations that were in the red have been put into the profit column for keeps by installation of a "Swintek." CHALLENGE that statement—we would like to prove it to you. See an installation—send for Catalog 745

At Left: Special lightweight 60' Eagle ladder increased output 400% for Penn Jersey Sand & Gravel Co., Bridgeport, N. J.—average over 150-tons per hour, using 6" pump.

By installing an 8"-45' Heavy Duty Eagle "Swintek," Bowersock Sand Co., Lawrence Kan., doubled production, cut through clay strata to reach virgin sand, keep rocks out of line. "Sorry they did not buy it sooner."

SINCE 1872 Progress....Service

"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS

EAGLE IRON WORKS
159 Holcomb Ave. • Des Moines, Iowa

New Batching Bin Cuts Labor Costs

A new batching bin for proportioning concrete aggregate by weight has been developed by the Carrollton Mfg. Co., 5350 Montrose Drive, Dallas, Texas, to cut labor costs and speed operations. Its weight of 1,750 pounds includes its two-wheel high-speed trailer. The bin can be unloaded or loaded on its trailer and set up ready for use in a few minutes. The trailer enables it to be hauled behind a pick-up truck or automobile at road speed. Capacity of the bin is approximately 1 cubic yard—large enough to hold separated gravel and sand for one batch of a 16-S mixer. The scales have a 3,000-pound capacity and are constructed to stand the impact of materials dumped into the bin by a front-end loader. The bin is mounted on a 5-foot 4-inch x 5-foot base and has a height of approximately 6 feet when set for use.

Here's how the bin is used. A front-end loader delivers a load of gravel from the storage pile to a special rack from which it can be loaded into the bin in controlled quantities until the right amount is weighed on the specially designed scale. The sand is then delivered and weighed in accumulative weights with the gravel. The bin is rolled forward by a lever which holds it in position for discharging into the mixer skip. The bin can then be moved back for reloading, and to clear the mixer skip so that it can be raised.

By using almost any rubber-tired tractor with front-end loader, wheelbarrows, scales, and an expensive batching plant are eliminated, the company explains. One man is all that is required to operate the batching bin, and another on the front-end loader.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 61.

The mobile Carrollton batching bin has a 1-cubic-yard capacity and can be loaded by any rubber-tired tractor with front-end loader. A special lever rolls the bin forward and holds it in position for discharging to the mixer skip.

ASA Award Goes to Prentis

Edmund A. Prentis, a partner in the New York firm of Spencer, White & Prentis, Inc., was awarded a certificate for his outstanding service in standardization at the President's Annual Luncheon of the American Standards Association on June 22. The award recognized his service in policy-making in support of the standards movement as a means of advancing the national economy.

Arc-Welding Accessories

A new 32-page catalog of arc-welding accessories is announced by Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y. It covers the M & T line of holders, helmets, cable, ground clamps, goggles, cleaning tools, and protective clothing. It describes each product completely, including specifications and data on replacement parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 3.

Added to Keystone Staff

Hiram McCullough is now covering the middle-Atlantic and New England states as sales representative for Keystone Asphalt Products Co., of Chicago. His headquarters are temporarily in Williamsport, Pa. He served as a Major in the Corps of Engineers during the last war, with service in New Guinea, the Philippines, and Guam. John Forster has been added to Keystone's Chicago office sales staff.

THE ANSWER TO THE ENGINEER'S PRAYER

BREAKS CONCRETE FASTER

TAMPS BACKFILL BETTER AND FASTER FOR LESS

THE NEW, MORE POWERFUL

MIGHTY "B" MIDGET

Stronger construction, greater hitting force, increased mobility and easier operation are a few of the many improvements of this great new pavement breaker. Actual performance records under the toughest conditions show that this machine has a capacity of breaking 12" concrete. Operates on either 105 or 160 C.F.M. Compressor. Conventional Automotive rear end drive —equipped with 710 x 15 tires—manual or automatically operated.

Write for Complete Information to Dept. C

R. P. B. CORPORATION

2751 East 11th Street Los Angeles 23, California

real **HELP** *on map-making problems*

TIME AND COST are two of the most important "bottleneck" problems map makers face today. And here's an easy way to solve these problems—and get better maps at the same time!

First, Monsen Trans-Adhesive Map Type Impressions reduce the time necessary to place the names of countries, cities, towns, mountains, rivers, oceans, etc., in the proper positions on original map drawings. And they can be removed for changes without damage to the drawing—an important cost feature considering the vast number of changes now being made on maps.

Trans-Adhesive Map Type is transparent. After you decide where you want it each word will stick permanently, without rubber cement, paste or wetting agent!

Monsen Trans-Adhesive Map Type impressions are easy to use and extremely economical to apply. Send today for samples and more information. Or, if you have a particular map type problem, consult one of our topographers who will submit type styles for economical map reproduction. There is no charge for this service.

MONSEN *Chicago* 22 E. Illinois Street
Los Angeles 928 S. Figueroa Street

save time and money

MAIL TODAY!

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Please send me free samples of Monsen Trans-Adhesive Map Type Impressions with a Price List showing Map Type Styles.

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ADDRESS_____

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Water Ever-Present On 3 Sewer Contracts

Trenches for 8 to 24-Inch Pipe Are in Wet, Silty Soil; Require Wellpoint Systems, Sheeting

✦ CRANSTON, R. I., is engaged in a program of sewer construction to extend existing facilities in the eastern part of the city where no pipe lines have ever before been laid. The city is a residential one with an estimated population of 50,000 living within an area of 29 square miles. This particular section of it is an old one lying between the cities of Providence on the north and Warwick on the south.

The largest current contract under way in the city was awarded by the Department of Public Works to Rocco Zoppo of Norwood, Mass., on his low bid of $1,146,480. The major items in this contract include the installation of 12 miles of 8 to 12-inch lateral sewers, and 7¾ miles of 6-inch service connecting sewers, together with 320 poured-in-place concrete manholes. All the pipe is clay, supplied by the Evans Pipe Co. of Uhrichsville, Ohio. Work got under way the end of February, 1949, and is scheduled for completion by the end of September, 1950.

Next in size on the present work is an $894,627 contract on which the Capaldi Bros. Construction Co. of Providence, R. I., is engaged. This job also got started in February, 1949, and is expected to be finished next month. Its principal features include laying 3⅓ miles of 8 to 24-inch clay sewer mains, and 1,700 feet of 24-inch reinforced-concrete force main, together with approximately 80 manholes and about a mile of 6-inch service connecting clay sewers. On this job the clay pipe was also obtained from the Evans Pipe Co., while the concrete pipe was supplied by the Hume Pipe Co. of Saugus, Mass.

These two large contracts are being directed by the consulting engineering firm of Fay, Spofford & Thorndike of Boston, Mass., which handles both the engineering design and construction supervision.

Ambrose Contract

A third contract, active during last year's construction season, was awarded by the city to John Ambrose, a Cranston contractor, on his low bid of $24,900. The Sewer Division of the Department of Public Works looked after the inspection on this job, which included digging a trench 1,150 feet long on Villa Avenue and installing in it a 10-inch clay sewer line and a 21-inch reinforced-concrete storm drain. The job was completed last summer in two months. The Rhode Island Concrete Pipe Co. of Providence supplied the storm drain, while the clay pipe came from the Portland Stone Ware Co. of Portland, Pa.

To contain these two lines a trench was dug 6½ feet wide and with an average depth of 11 feet. The excavation was handled by a Lorain 41 crane equipped with a short 25-foot boom for working under trees and overhead wires in the city streets. At the end of the boom was a Williams heavy-duty ⅝-yard clamshell bucket. Water was encountered in the running silty soil at a depth of 4 feet, but was kept under control in the trench with a couple of Mud-Hog 4-inch pumps. As the digging progressed, 2 x 8 tongue-and-groove sheeting in 12-foot lengths was driven to full trench depth along both sides of the cut.

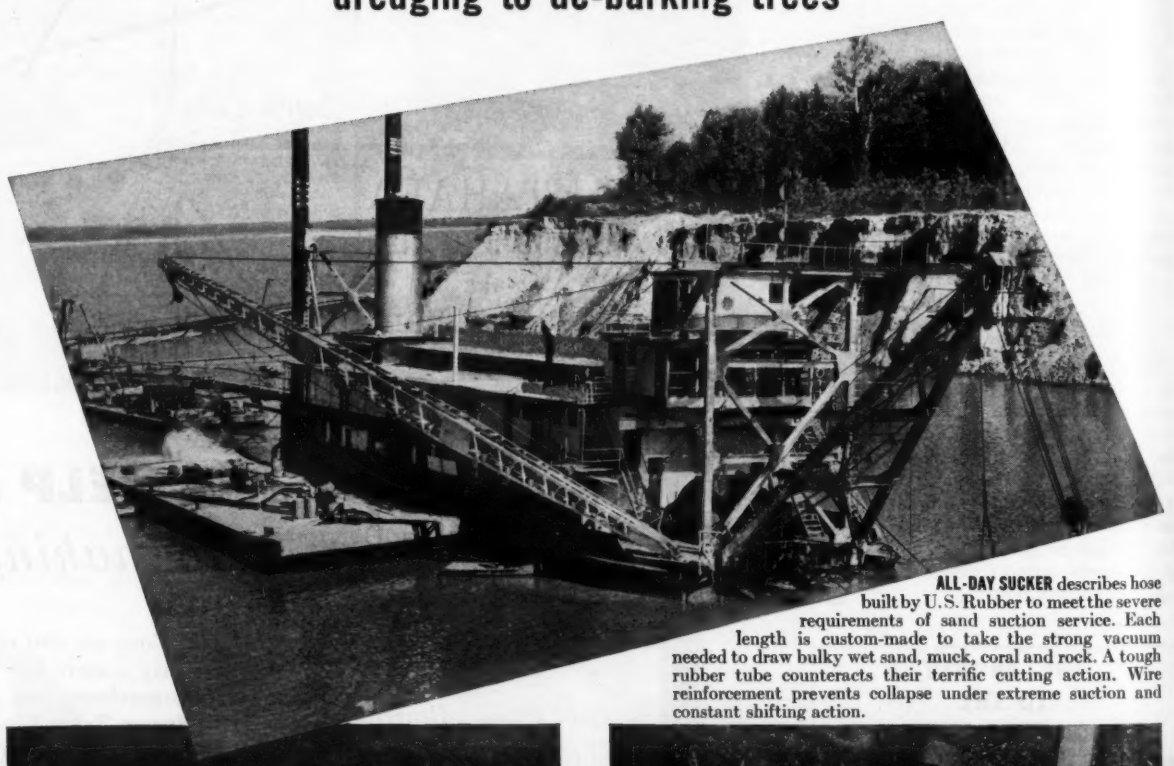
Driving was done with an Ingersoll-Rand 530 air hammer powered by a Schramm 110-cfm compressor. A lit-

(*Continued on next page*)

C. & E. M. Photo
On its part of the Cranston sewer project, Capaldi Bros. used a Hough Payloader on a TD-14 tractor to extract tongue-and-groove sheeting from trenches.

THRIVING ON A DIET OF MUD AND WATER

U. S. Rubber Hose does a multitude of jobs from dredging to de-barking trees



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C. & E. M. Photo
An Ingersoll-Rand air hammer drives sheeting for a trench on the Ambrose part of the job.

the ditcher or trenching machine in excavating, because the cuts were too deep, the ground too wet, and other underground utilities too numerous for steady progress. Digging was done with three Northwest rigs—a ¾-yard Pull-shovel and two cranes of 1 and ¾-yard size. Practically all the trenches were sheeted; 3-inch tongue-and-groove stock was used when the depth got down to 20 feet or more. A Joy hammer and I-R hammers drove the sheeting, with the air supplied by a Gardner-Denver 500-cfm compressor. Dewatering of the trenches was handled by Complete wellpoint systems hooked up with three 8-inch Complete pumps. Backfilling and sheeting extraction were done with two International units —a TD-9 dozer and a TD-14 tractor equipped with a Hough Payloader.

The timber sheeting was removed over most of the job, but occasionally it was left in where it had been driven below the invert of a near-by pipe, or to protect a drainage structure. All the

(Concluded on next page)

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tle below ground level the sheeting was braced longitudinally with 20-foot lengths of 6 x 8's along each side. At 10-foot intervals other 6 x 8's were inserted as cross bracing. As the trench deepened, additional longitudinal and cross bracing was installed where needed. A timber A-frame was used in setting the two lines of pipe which were laid side by side on a 12-inch course of gravel spread over the bottom of the trench. John Ambrose supervised his force of 14 men employed on the contract.

Rocco Zoppo Contract

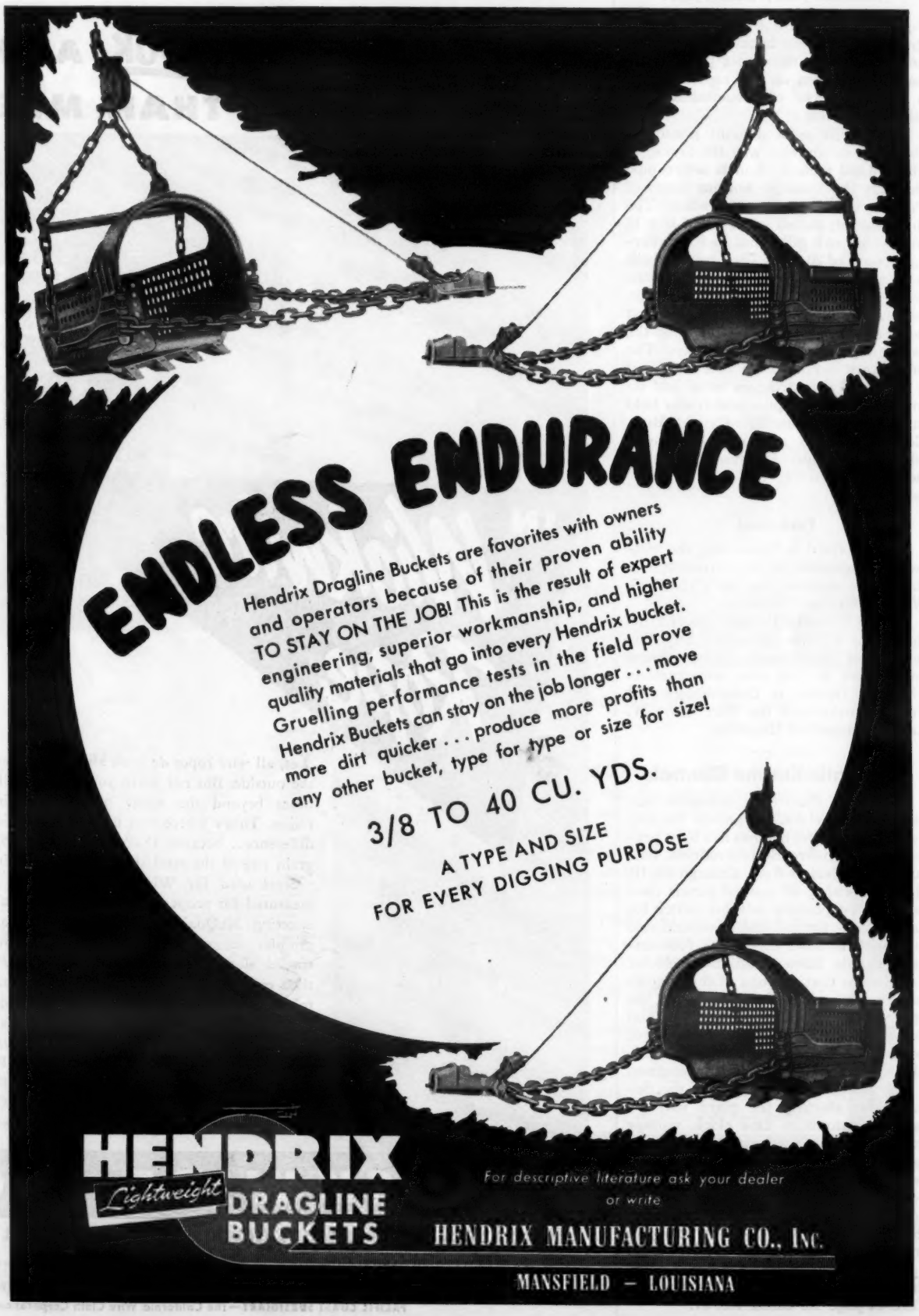
For excavation Rocco Zoppo brought to the job three Koehring ¾-yard pull shovels and a Koehring 304 crane equipped with a 45-foot boom and a ¾-yard clamshell bucket. Backfilling was usually done with an International TD-9 tractor and a Hough Payloader. About half of the trench work on this contract required sheeting, while the rest of the open cuts were supported by spot stay bracing. The maximum depth of trench was 19 feet, with the average around 12 feet. The 2 x 8 sheeting came in random widths with an average length of 14 feet and a maximum of 22 feet. Sheeting was driven with either Thor or I-R air hammers powered by I-R and Schramm 210-cfm compressors. Where sheeting was not used, places suspected of caving tendencies were supported with 4 x 8-foot plywood panels, ¾ inch thick, held in place by cross bracing.

To overcome ground water that was met in practically every cut, the contractor, Rocco Zoppo, employed Moretrench wellpoint systems; he had 900 feet of 6-inch header line. About 4 feet back from one side of the trench, 18 to 20-foot risers, 2 inches in diameter, were jetted into the ground with 90 pounds of water pressure from a Moretrench pump on the line. They were spotted on 5-foot centers, and driven so that their points were well below the invert of the pipe to be laid in the trench. A pair of Moretrench 8-inch pumps dewatered the trench and discharged the water in the direction of low swamplands so that it would not leach back into the trench.

Because of the ever-present water, not more than 400 feet of trench was opened at a time in these wet areas. Then the pipe was laid, the joints calked with G-K compound, and the trench backfilled before another section was excavated. For the 8 to 12-inch pipe that predominated on this contract, a 52-inch-wide trench was required. Rocco Zoppo employed from 80 to 85 men on his contract under the direction of Thomas Smigliani, Superintendent.

Capaldi Bros. Contract

Like the other contractors, the Capaldi Bros. Construction Co. eschewed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C. & E. M. Photo
Rocco Zoppo's Koehring crane excavates a 13-foot trench for an 8-inch sewer pipe. Notice the sheeting and the header line of the Moretrench wellpoint system.

Water Ever-Present On 3 Sewer Contracts

(*Continued from preceding page*)

pipe was laid on a 6-inch blanket of gravel. After the backfill was placed and compacted, the street paving that had been broken up was replaced with a 2-inch course of bituminous-macadam surfacing.

One of the most difficult phases of the Capaldi contract was the laying of about 3,000 feet of 24-inch sewer pipe through the swampy bottom lands of Pawtuxet River park reservation. The pipe was supported on bents of two 12 to 16-inch oak piles that had an average length of 20 feet. They were driven with a drop hammer 3 feet apart in the bent, with the bents spaced 8 feet on centers. A cut 5 to 6 feet deep had first been made over the alignment of the sewer pipe through the swamp. The piles were capped with 8 x 12's, and a pair of 6 x 8 stringers were laid on top to support the pipe which was held in place by wedges. The Capaldi Bros. Construction Co. employed a force of 40 men on the project under the direction of Vincent F. Capaldi, Superintendent.

Personnel

Fay, Spofford & Thorndike, the consulting engineers, were represented on the sewer construction by Forrest G. Wilder, Resident Engineer.

For the Cranston Department of Public Works, Charles Whipple, Superintendent of Maintenance, gave general supervision to the new construction. Elton F. Durfee is Commissioner of Public Works, and the Hon. Hoyt W. Lark is Mayor of Cranston.

Automatic Engine Controls

A circular describing automatic engine-generator control panels for gas, gasoline, or diesel engines has been prepared by Synchro-Start Products, Inc., 1046 W. Fullerton Ave., Chicago 14, Ill. It explains that all control panels contain a three-position selector switch for each engine, for automatic, manual, and off positions. Two, three, and four-engine panels have additional selector switches so that any one of the engines can be chosen as the lead, with the others automatically coming on and going off the line as the demand for power changes. This, the literature explains, balances wear on the engines.

The circular points out that the demand for starting the plant may be manual, automatic, time clock, voltage drop, pressure increase or decrease, temperature change, or any type of pilot switch indicating when power is, or is not, needed. It explains the standard protective features of these units and the mode of operation for various engines and generator combinations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 87.

Plywood Panel Makers Meet

West-coast plywood makers from Oregon, Washington, and California met last May to map sales-promotion plans for maintaining plywood demand at its present record-breaking level (the industry is turning out panels at an all-time high of 45,000,000 feet a week).

They re-elected Frost Snyder of Tacoma and Vancouver, Wash., President of the Douglas Fir Plywood Association. Vice President is Victor Olson of the Washington Veneer Co., Olympia, Wash. Secretary is Charles M. Duecy of Menasha Plywood Corp., North Bend, Wash. Treasurer is J. P. Simpson of Buffelen Mfg. Co., Tacoma.

Dr. Charles F. Roos, President of the Econometric Institute, Inc., New York City, told the panel makers that the demand for their product would remain relatively high over the next twelve months, reflecting the building boom as well as generally good business in other sectors of the national economy.

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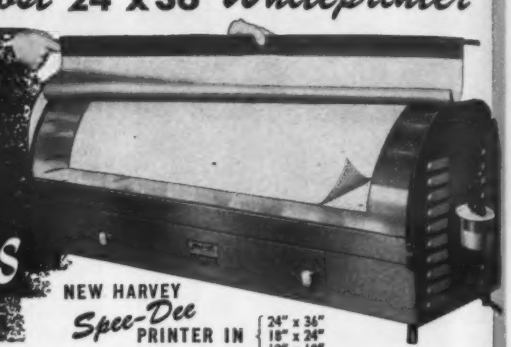

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Such quality control of basic properties is possible only with a company like Wickwire...where manufacture is integrated from molten metal to finished rope...where the know-how of 52 years experience goes into the making of every wire rope.

It explains, too, why Wickwire Rope always gives you uniform performance, enduring reliability and longer, more economical service on the job. For the *right* rope for your particular requirements, see your local Wickwire distributor. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed. For your free copy of "Know Your Ropes" write to: Wire Rope Sales Office, Wickwire Spencer Steel Division of C.F.&I., Palmer, Mass.

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PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

Schramm's Pneumatractor is a combination tractor-compressor which operates three interchangeable air tools—rock drill, paving breaker, and backfill tamper. They mount at the rear

Tractor-Compressor Mounts Air Tools

A combination tractor-compressor operating air tools—rock drill, paving breaker, and backfill tamper—has been developed by Schramm, Inc., West Chester, Pa. The mounting of the tools is interchangeable. They are mounted at the rear of the tractor. Standard equipment includes a vertical column with supporting brackets for mounting on the standard pads of the Pneumatractor frame, a pressure-regulating valve for control-line feeding pressure, and the necessary operating valves.

In operation, the Pneumatractor is moved until the tool is approximately over the desired working point. The air tool is mounted with its center line about 5 inches from the center line of the piston rod of the feeding cylinder, and can be moved within that radius. Quick traverse of the tool to the work and return is obtained through a lever convenient to the operator's seat. The tool is provided with a throttle valve for starting and stopping. Pressure in the feeding cylinder may be regulated by a pressure-regulating valve. The tool can be swiveled for operation vertically, horizontally, or at any intermediate angle, regardless of the ground level under the tractor, the company says.

The Schramm Pneumajack consists of a pneumatic cylinder mounted on a vertical column at the rear of the Pneumatractor, with a D-55 or D-45 Schramm rock drill mounted on the piston rod of the pneumatic cylinder. The drill has a 36-inch movement which easily enables 24-inch drill changes. This unit is designed for drilling holes in pavements, for mud-pumping, setting parking meters, production drilling in quarries, road building, excavating, grouting, and similar purposes.

The Schramm Pneumabreaker can be used with a wide chisel for breaking macadam, with a moil point or narrow chisel for breaking concrete, or with a special adapter for driving posts, form pins, stakes, etc. Two BT-32 Schramm backfill tampers may also be mounted on the pneumatic cylinders for multiple tamping in ditches and trenches. These tools all use the same basic air cylinder that feeds and lifts them. They may be removed and used as hand-held tools if desired.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 95.

Vegetation Control By Chemical Spray

A fully illustrated 24-page booklet on vegetation control with liquid sprays has been prepared by the Agricultural Chemical Division of The Dow Chemical Co., Midland, Mich. It outlines the history of Dow's work with chemical weed and brush-control chemicals, and details specific company products and their applications.

Dow manufactures chemicals for highway and right-of-way use that are designed to control specific weeds, brush, or grasses, as well as those for more general use. The literature indicates components of each of the products, recommends methods of application, and lists the vegetation for which each chemical is designed.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 96.

Quick Carburetor Cleaning

A catalog sheet on the Gumouter, a tool for cleaning carburetors with Gumout without taking them apart or off the engine, has been prepared by the Gumout Division of Pennsylvania Refining Co., 2686 Lisbon Road, Cleveland 4, Ohio. The sheet gives complete directions for using the Gumouter, as well as sales information on the tool. It explains that it requires less than twenty minutes to apply Gumout directly through the float chamber of the carburetor.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 101.

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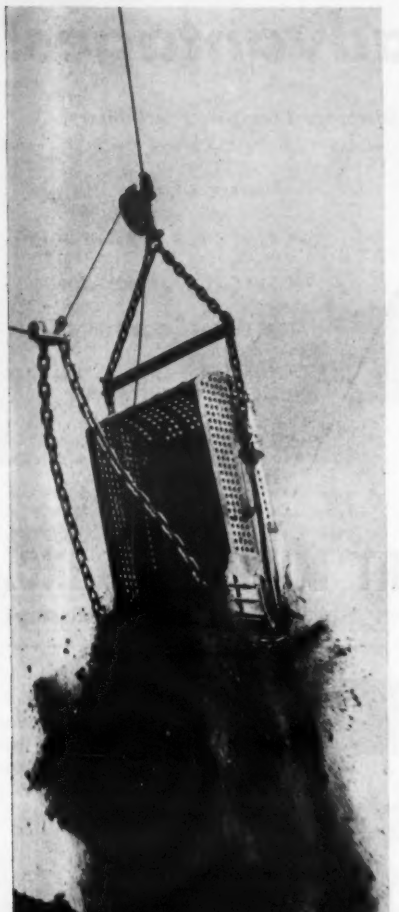


Pay dirt! A Hendrix bucket explodes 8½ cubic yards of material onto a spoil bank alongside the Delta-Mendota Canal near Newman, California.

Powerful Draglines Rip

A Double Spotting System With Real Cooperation From Catskinners Accounts for High Yardage

By RAYMOND P. DAY,
Western Editor

✦ EIGHT MILLION cubic yards of earth, from sandy loam to cemented conglomerate, stood in the way when Western Contracting Corp. started the construction of 32 miles of the Central Valley Project's Delta-Mendota Canal near Newman, Calif. That yardage is being whittled away by good equipment and by excavation men whose main claim to construction fame is their know-how of dirt mucking.

As a guide to the performance, just one machine of the Western equipment spread moved 359,000 cubic yards in a 26-day month. The digging was good then, but the smiles on the faces of dirt men when they tell it shows how pleased they were by the performance. And these are the same men, by the way, who carry gold Hamilton watches in appreciation of earth-moving records they set in 1948 at Pickstown, S. Dak., in connection with Fort Randall Dam.

A unique system of spotting the draglines and coordinating their efforts with those of attendant tractors which grade the canal banks has accounted for yardages which come close to being capacity figures for the machines in use.

Big Block of Dirt

The canal prism being excavated consists of an extremely large block of earth, especially in the hilly country through which some of the canal passes. Plans call for the earth to be spoiled along the canal according to methods which are calculated to please the eye and reduce to a minimum the amount of erosion later on.

No material can be stacked higher than 25 feet, unless a berm at least 25 feet wide is left to the edge of the previous stack. In addition, a 25-foot berm, or service road, is left at the edge of the canal. This slopes away from the canal to insure good drainage.

For the first 8 or 9 miles, the canal was easy to dig. The formation was largely sandy loam. Then the machines hit low hills with dune sand and clay pockets. After a mile of this, there was another mile of particularly hard material to dig, because a ledge of clay-bound and cemented gravel about 2 feet thick lay just above final grade. It finally yielded when rippers were brought in, but it was a tough fight.

When the job was visited the machines were entering the worst part of the digging, which was expected to continue to the end of the job. The formations of cemented conglomerate and siltstone were becoming so thick that rippers could no longer stay ahead. Plans have been made to bring in Bucyrus-Erie churn drills with 9 and 10-inch tool strings, to break up the rocky formations ahead of the excavating machines.

Draglines Dig Canal

The main canal prism is being excavated by two Marion 7200 walking draglines with 120-foot booms and dragline buckets. For the sandy digging, the machines use 8½-yard Hendrix lightweight buckets; for harder digging, Hendrix 8-yarders and a Page 6-yard bucket.

Two Model 111-M Marion draglines with 90-foot booms and 4 and 5-yard Page and Hendrix buckets are also being used for the excavation of canal proper, particularly in those sections where the canal cut is shallow. On part of the canal, where the prism was extremely deep, a subcontractor with tractor equipment mucked out the center block of hilly cuts to bring the remainder of the material within dragline range. H. B. Adair Co. did this work, using Cats and scrapers.

Structure excavation, after the canal is finished at that point, is being handled by a Koehring 604 dragline and a 605. A Bucyrus-Erie 22-B truck crane is also doing odd jobs in connection with structure excavation. It is equipped with a clamshell bucket.

A unique method of spotting the big draglines on canal excavation, in order to use them to optimum advantage, is being used. For the first part of the cut, the Marion 7200 machines are set in close to the edge of the canal and reach across to the far side. This dirt is then swung out as far as the dump limit lines will eventually go, and dumped. When this block of excavation has been dug out about 5 feet deep along the slope, the machine moves over near the center of the canal and begins the excavation of the side near where it was previously spotted.

While this is in progress, a Caterpillar D8 with a Caterpillar bulldozer moves in to the area just vacated. With its low-side track resting on solid and undug material left in the canal prism, it grades the side slope to within a few inches of theoretical grade. This grade is checked by a grade engineer employed by the company, who stays with the machine while it works.

When the tractor has finished sloping the bank, the big dragline moves back into position to take another lift out of that side of the cut. While it is busy there, the D8 moves over to slope that part of the bank on the opposite side which was opened up by the dragline. Working together with close cooperation, the draglines and their attending tractors dig out the entire canal prism and dispose of it in the designated spoil banks. The tractors even find time to level off the berms on the spoil piles, make roads, and clean up the canal bottom around the draglines.

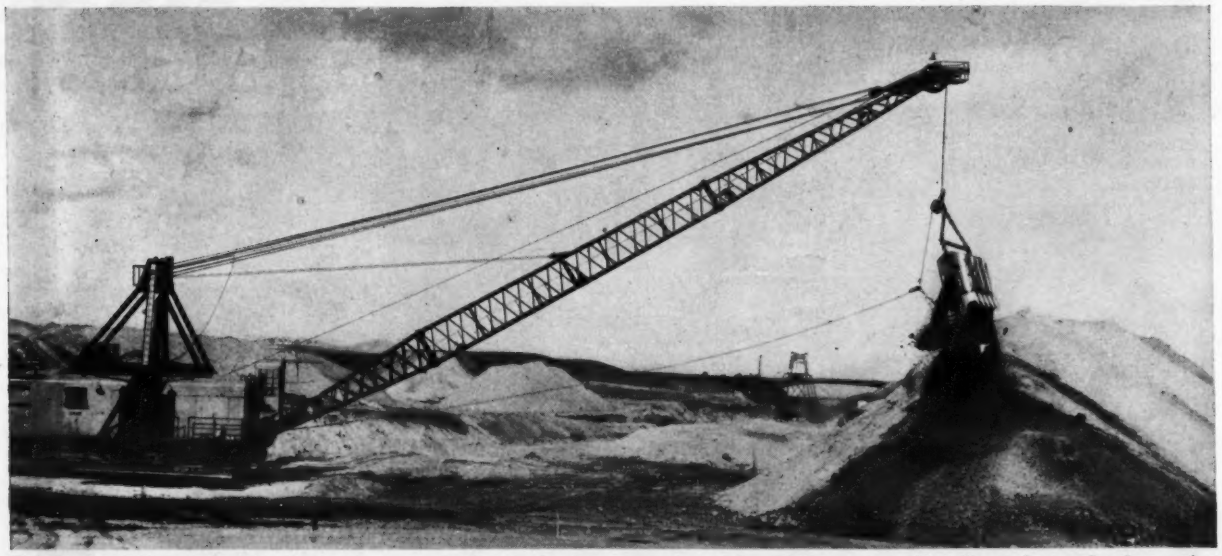
Jim Briggs, Excavation Superintendent in charge of dirt work, said, "Our bulldozer operators are the best in this part of the country. Their job is one that calls for real skill, and at the same time they certainly can't be lazy, because there's always plenty of work for them to do."

The employment of bulldozers to push in as much of the slope yardage as possible gives the big draglines a chance to dig a full bucket every pass, and get it quickly without having to slow down for grade. If the draglines get within a foot or so of theoretical grade the bulldozers can get the rest. The trick is in digging just enough at one time so the tractors can always have a track solidly against original dirt. They can work on a 1½ to 1 slope, but unless they have their tracks against something solid they cannot push great amounts of earth.

One of the Marion 7200's, digging in sandy material on the first contract, accounted for the 359,000 yards of material. Even in hard material, where occasional chunks of cemented conglomerate are found, the machines account for about 10,000 cubic yards a

(Concluded on page 42)

C. & E. M. Photos



This Marion 7200 walking dragline is the power behind the bucket. She and a sister 7200 are excavating the main canal prism, using 120-foot booms and Hendrix or Page buckets. The earth is spoiled carefully along the canal, usually in stacks no higher than 25 feet.

Once a dragline has moved over to begin excavating the side near which she was spotted, a Caterpillar D8-mounted dozer moves in and with its low-side track on solid undug material, slopes the bank to within a few inches of theoretical grade.

Canal Path; Liners Set Record

1,185 Feet of Lining Laid By Slip Form in 8-Hour Shift on Canal With 48-Foot Bottom

✦ IN 8 hours' paving time, a concrete crew has recently placed 1,185 feet of concrete lining 4 inches thick on the sides and bottom of the Delta-Mendota Canal near Newman, Calif., key water-transfer feature of the Central Valley Project. The pavement covered an area of 112.28 square feet per linear foot of canal, making a covered area of 133,059 square feet in a single shift.

So far as the men who performed the feat know—men of Western Contracting Corp.—it is one of the best concrete-lining records ever achieved on irrigation-canal work of the U. S. Bureau of Reclamation. The work on which the amazing amount of concrete was placed is a 32-mile section of canal 48 feet wide on the bottom, with 1½ to 1 side slopes. The job includes two contracts with the Bureau, which total about $9,000,000 in contract costs.

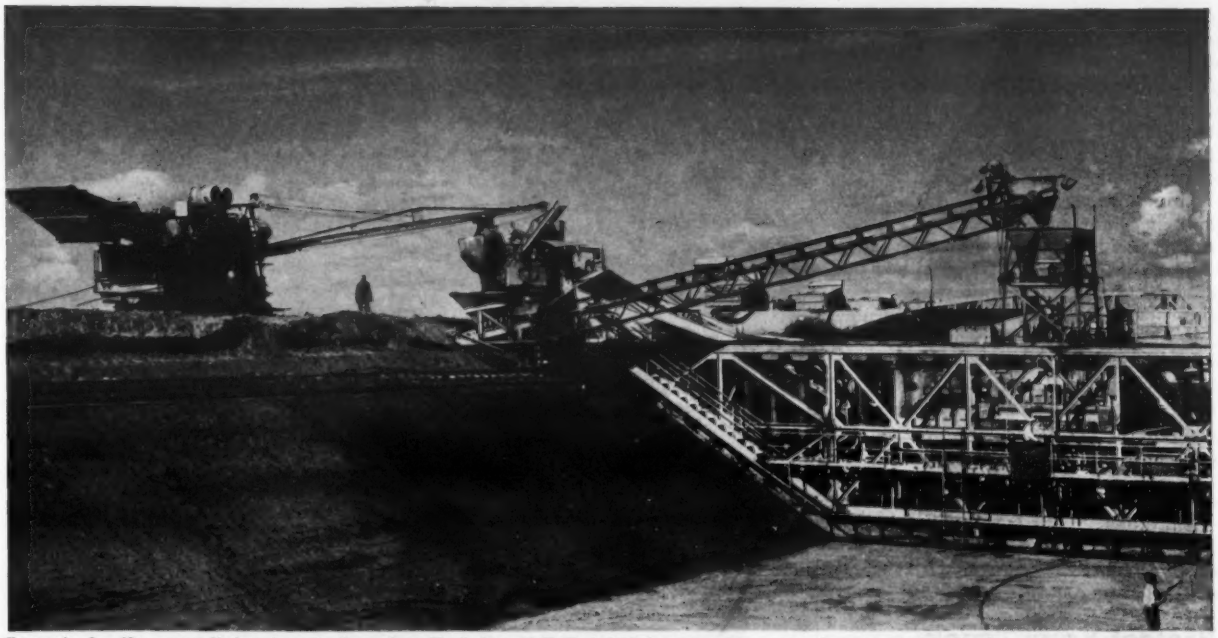
Concrete lining is being placed by huge machines which ride along on rails set 110 feet apart. In the equipment line-up there is a mechanical trimmer which dresses the slope and bottom to exact grade, a heavy slip form which takes concrete from the pavers and places it on the sides and bottom, a finishing jumbo which holds the men who put on the final finish, and a curing jumbo which applies curing solution.

Improvements on Machines

The machines, and especially the slip form, embody certain improvements over similar equipment used in the past. Most of this equipment has been made to special order in private mechanical shops. The slip form and trimmer used by Western on this project were made to the company's plans in the Alhambra, Calif., shops of Vinnel Co.

The slip form has much larger hydraulic jacks than some of those used on previous equipment. This helps to

(*Continued on page* 43, *Col.* 4)



Concrete for the canal lining travels from two Koehring 34-E Twinbatch pavers to a surge hopper on the slip-form deck. A small traveling car then distributes it to hoppers all the way across the 190-ton machine.

Concrete reaches the base of the slip form through trunks and bunkers above the vibrating tube to which Syntron vibrators are connected. Here a Western Corp. workman sprinkles the subgrade ahead of the slip form.

C. & E. M. Photos

A crew of 16 cement finishers works from the finishing jumbo, cutting transverse dummy joints and edging contraction joints.

Behind the finishing jumbo comes the curing jumbo. The concrete lining of the canal is being cured with white-pigmented curing solution under a subcontract with Hunt Process Co. of Los Angeles.

Powerful Draglines Rip Path for Canal

(*Continued from page 40*)

day. Excavation operations continue around the clock, with portable light towers for night operation.

The machines get their fuel and lubricants from portable units which visit the job each shift. One field mechanic is on duty each shift to take care of any trouble which might develop. Spare parts are stocked at the yard, and any hint of a breakdown brings the mechanic force on the run.

The high banks of dirt on either side of the big canal are mute evidence of the progress of Central California's largest man-made river, and motorists traveling State Route 33 south from Tracy can see at a glance the route of water from the Sacramento and San Joaquin Rivers south to water-thirsty acres.

Briggs, the Excavation Superintendent, works under General Superintendent Collins, with R. A. Heitman as District Engineer for Western's work on the Pacific Coast.

Protect Your Truck Against Icy Roads

To supplement good brakes, which are only a limited safety assurance on icy roads, Highway Safety Appliances, Inc., 1381 Marshall Ave., St. Paul 4, Minn., makes an electric road sander. These sanders mount in front of the rear tires to give positive skid control.

The Elston sanders are designed for both dual and single-tired trucks and tractors. They have 100-pound hoppers and cab or dashboard-mounted controls. The nonclogging horizontal grit control valve is designed to drop grit under the truck tires during the braking action. The company states that National Safety Council tests have shown that the sanders reduce braking distances up to 40 per cent on glare ice.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 114.

Improved Fuel Pump

A new fuel pump, 65 per cent lighter in weight and 56 per cent smaller in size, has been announced by Cummins Engine Co., Inc., Columbus, Ind., for its line of automotive and stationary engines. The decrease in size and weight makes it easier to install and maintain the pump, and reduces the overall weight of Cummins diesels.

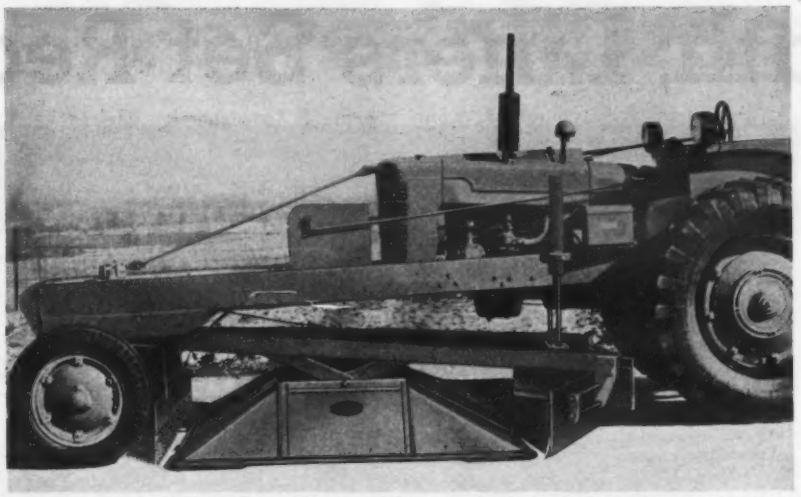
The new DD pump is now offered as standard equipment on the 300-hp Model NHRS-600 and 275-hp Model NHS-600 diesels, and is available as optional equipment on other models. Its design enables unit replacement of fuel pressure pumps, distributor disks, and governor assembly without removing the pump from the engine.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 10.

New Heater-Planer For Asphalt Roads

A new asphalt road heater-planer, Model 31, has been announced by the Asphalt Maintenance Co., 41 Park Row, New York 7, N. Y. It is powered by an International gasoline engine and has an electric starter, generator, battery, oil-bath air cleaner, heat indicator, and oil-pressure gage.

Surface heat is supplied by a flat or horizontal flame thrown into a 6 x 6-foot heating hood. The flame is developed by mixing fuel-oil with air under pressure and charging into a single Clarkmoore fuel-oil burner. From the single burner it is deflected by the hood surface to the asphalt pavement. The heat enables proper planing action by a two-section planing blade which cuts and removes the rough and corrugated asphalt pavement to any desired depth. The ¾ x 12-inch moldboard is made in two sections and arranged to windrow the planed material between the rear wheels. The blade assembly is hydraulically controlled and may be lifted 11 inches above the pavement surface.



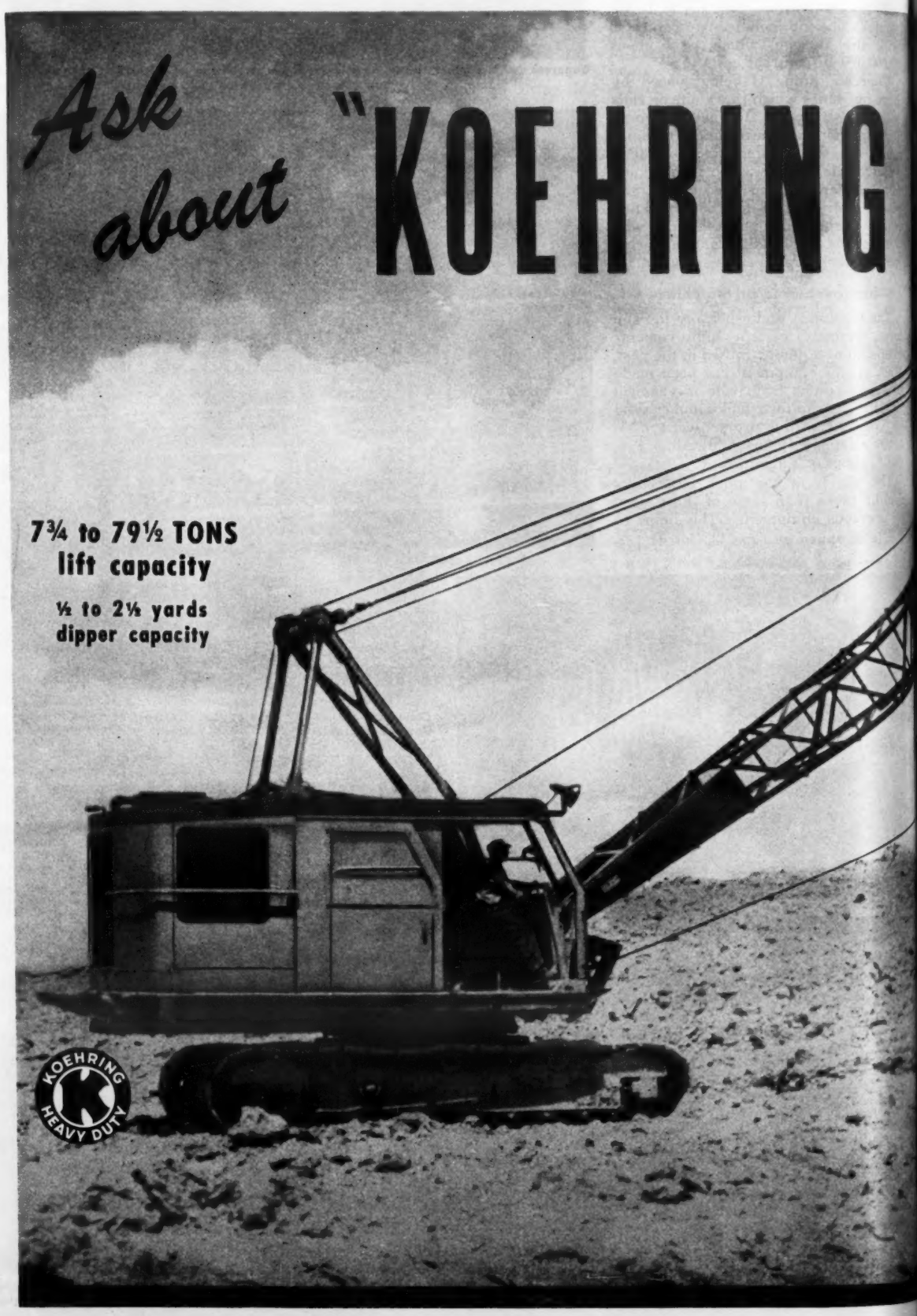
The burner on the new Clarkmoore asphalt-road planer throws a flat flame into the heating hood, which deflects it to the asphalt pavement. A 6-foot planing blade can then cut and remove rough or corrugated asphalt pavement without tearing or gouging.

The frame of the planer is made of heavy structural members, fully boxed and all electrically welded. The fuel-oil tank is between the side members of the frame. The unit has 5 forward speeds and 1 reverse.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 38.

Cleco Opens New Branch

A new factory branch and warehouse at 2832 E. Grand Blvd., Detroit, now stocks a large supply of air tools, air-line couplings, valves, chisels, etc. made by the Cleco Division of the Reed Roller Bit Co. Jim Reed and Roger Winship are serving as Cleco factory representatives in the Detroit area.



Belt-Conveyor Line

A line of belt conveyors for gravel, sand, cement, or other bulk-material transfer is manufactured by La Croix Co., New York Bldg., St. Paul 1, Minn. The conveyors are available in lengths up to 160 feet and with belt widths of 18, 24, 30, and 36 inches. The portable models are adapted for quick job-to-job movement; the stationary models can be knocked down in sections before moving to new locations.

Conveyor frames are constructed of steel sections to eliminate the possibility of sagging. Tail, head, and jack shafts are mounted in 1 7/8-inch dust-proof heavy-duty roller-bearing pillow blocks. The portable conveyors can be locked in any position up to 26 degrees, the company says. The hydraulic A-frame is hand-operated. Antifriction bearings are used throughout.

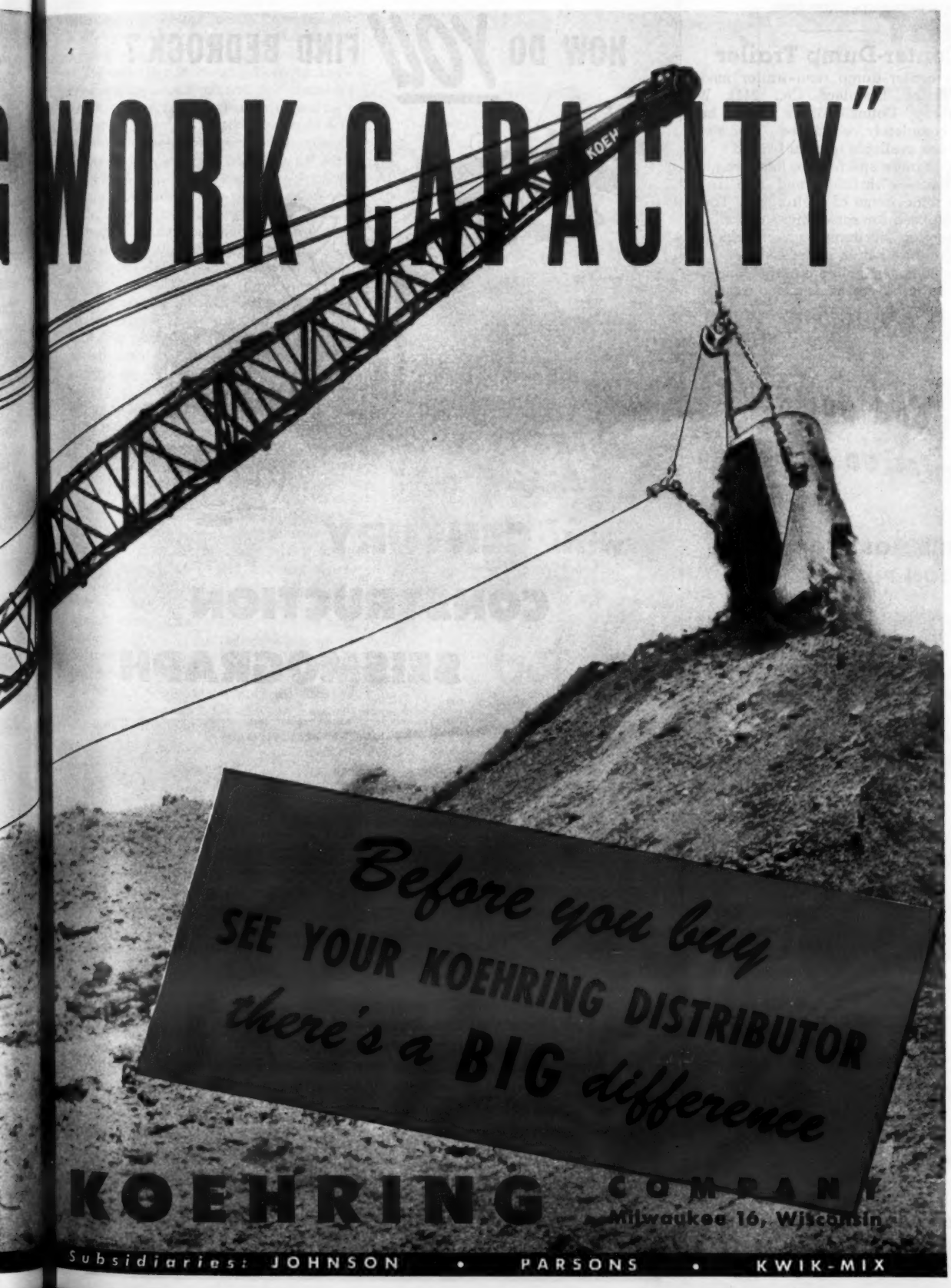
The conveyors are available with three types of drive: power to the jack shaft, mounted under the conveyor; power to the jack shaft, mounted on top of the conveyor; and power mounted on the lower end of the conveyor to the tumbler shaft drive. Screens and shovel hoppers may be easily installed on the La Croix conveyors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 113.

La Croix makes these portable or stationary conveyors in lengths up to 160 feet and with belt widths of 18, 24, 30, and 36 inches.

I-H Product Specialist

The new Power Products Specialist of International Harvester Co., Chicago, is L. J. Lange. He succeeds S. L. Siegfried. His duties will be concerned with the design and sale of wheel and crawler tractors and power units



Liners Set Record On Canal Project

(*Continued from page 41*)

keep the machine true to the canal plane. A dual drive has also been incorporated on each set of wheel trucks, and the speed of each drive can be controlled through Allis-Chalmers reduction gear boxes at each truck. Variable-speed drive on this equipment is so efficient, despite its great size, that all curves have been made without difficulty.

A different system of concrete vibration is also used. Syntron vibrators are fastened to the base of the slip-form frame and connected to a tube. Controlled by the slip-form operator, the vibrators do an excellent job of leaving the concrete smooth and compact behind the machine.

Lining Follows a Sequence

Canal lining is extremely well organized, all the way through from the batch-truck arrangement to curing. The former is no easy problem, either, for as many as 60 batch trucks have to be arranged for to keep the slip form supplied.

The heavy railroad rails which support the machines as they do their work are being laid by the Richter Co., a subcontractor. Two small truck cranes and several flat-bed trucks move the rail sections ahead. The rails are laid down on the 10-foot service road on either side of the canal.

First machine over the rails is the heavy trimmer. It is basically a series of buckets, driven by Caterpillar diesel engines, all mounted on a heavy frame. When the western editor of CONTRACTORS AND ENGINEERS MONTHLY saw the work, the trimming machine had not yet encountered anything it could not dig. It was expected, however, that some of the rocky sections farther along might have to be undercut and backfilled with dirt to give the trimmer a bank to work against.

The trimmer generally removes less than 6 inches of material to leave the canal banks beautifully smooth. The extreme care employed at the time of excavation, and all the checking which is done by the engineer who watches over each spread, has certainly paid off in ease of trimming, according to men at the trimmer.

The dry batches of concrete are hauled in to two Koehring 34-E Twin-batch pavers, both working at top speed. (C. & E. M. carried the aggregate production story last month on page 61.) Both pavers are spotted on the same side of the slip form, and are faced the opposite way from each other. A line of trucks spots in front of each paver skip, and dumpmen back them in by signal and dump the batches. Everything is fast. The loads are hauled great distances without covers, for the cement is sandwiched in a pocket between the rock and sand.

Mixing water is hauled to each paver by Caterpillar DW10 units and water tanks. For a long time, mixing water was pumped from a well and put in the finished canal. An earth dike was placed to retain the water, which was then pumped out to the hauling units as required. This scheme is still being used wherever possible to reduce the length of haul.

As the pavers finish mixing the concrete, they discharge it direct to a surge hopper on the slip-form deck. A small traveling car takes the concrete and distributes it to hoppers all the way across the 190-ton machine. The concrete reaches the base of the slip form through steel trunks and small bunkers just above the vibrating tube.

Most of the functions of the slip form are electrically controlled, with power furnished by Caterpillar diesel-electric sets on board.

(*Concluded on next page*)

Liners Set Record On Canal Project

(Continued from preceding page)

Longitudinal joints in the sides and bottom of the canal concrete are cut by knives on the slip-form frame. These knives leave a rough groove about ½ inch wide and 2 inches deep. The groove is finished by edging tools later on, when the finishing jumbo comes along. The only finishing done from the slip form is some steel-float work to smooth out any of the worst irregularities which may show up.

A crew of 16 cement finishers works from the finishing jumbo. This crew places the final finish, cuts the transverse dummy grooves, and finishes all the contraction joints with edging tools. The lining is left with a steel-troweled finish. All finishing is generally worked upward on the slope, and when this precaution is taken, the concrete shows no tendency to sag or run on the 1½ to 1 slope.

The concrete is being cured with white-pigmented curing solution under a subcontract with Hunt Process Co. of Los Angeles. Hunt Process is also placing the mastic joint filler on the first contract. This material has been discontinued on the second contract, and Bureau engineers say that its use will be generally discontinued as the canal winds farther south. The dummy grooves will control the cracking, and it is not believed that much water will be lost.

Five moves of the heavy canal trimming and lining machines will have to be made to clear obstructions. This will entail a certain amount of delay, but plans are now under way to jack the machines up and run them under their own power over heavy cribbing to the next location.

Structures Poured Direct

The many structures in the Western contract are also being poured in an interesting manner. Several Koehring Twinbatch 34-E pavers have been equipped with 60-foot booms and conveyors so they can dump their own concrete direct to any part of the structure. Many of the pours are so small that a great deal of concrete was being wasted, and the newer method has solved that difficulty. Dry batches are hauled to these specially equipped machines in the usual way.

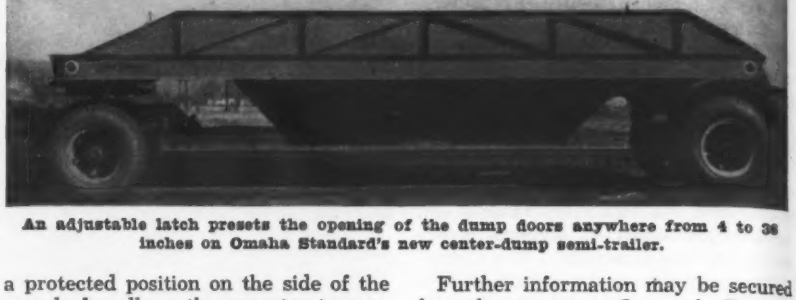
Forms are generally wood panels, prefabbed in a carpenter yard centrally located near the aggregate plant. They are hauled out to the job by truck and erected with the help of the 22-B Bucyrus-Erie truck crane. There are also two Bucyrus-Erie Hydro-Cranes on the job, which are sometimes used to set forms.

Field supervisors for Western Contracting Corp. include Wes Rogers as Liner Superintendent and M. K. Young as Structure Superintendent.

Center-Dump Trailer

The center-dump semi-trailer made by Omaha Standard Co., 2411 W. Broadway, Council Bluffs, Iowa, has been completely redesigned. The new units are available in sizes from 8 to 14 yards or more and feature light weight, compliance with bridge and axle laws, and a wide range of usefulness. They may be used for spreading, stockpiling, windrowing, or dumping rock, gravel, dirt, and other bulk materials.

The company points out that an adjustable latch mechanism, mounted in a protected position on the side of the new body, allows the operator to preset the opening of the dump doors anywhere from 4 to 36 inches, to provide an even flow of material while dumping. The latch can be adjusted with the doors open or closed. Hopper bottoms are especially designed to handle the materials specified by the user. The main-frame members of the trailer pass outside the hopper, to prevent any tendency of the load to bridge or clog. Body side walls are braced with angle iron running the length of the trailer.



An adjustable latch presets the opening of the dump doors anywhere from 4 to 36 inches on Omaha Standard's new center-dump semi-trailer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 35.

New Ryerson Div. Mgr.

Allen P. Beckloff has been named Manager of the Tubular Products Division of Joseph T. Ryerson & Son, Inc. Formerly Manager of the Tubular Products Department of the Ryerson plant in Cleveland, he succeeds R. W. Burt, now Sales Manager of the Chicago plant.

Marlow Pumps

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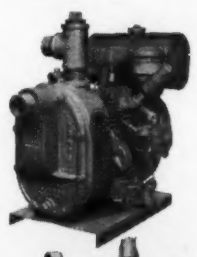

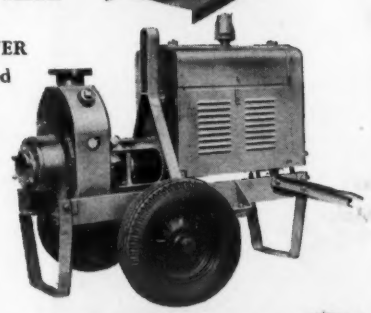

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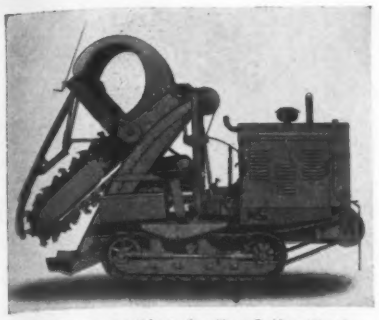

Maximum working depth of the Buckeye Model 402 service utility ditcher is 4 feet; maximum cutting width is 8 inches; digging speed, 1,308 fph.

New Trench Digger For General Service

A new ditching machine, the Buckeye Model 402 service utility ditcher, has been announced by the Findlay Division of Gar Wood Industries, Inc., Findlay, Ohio. It has a maximum cutting depth of 4 feet and a cutting width of 8 inches, and is designed for house service connections; telephone, gas, water, or electrical lines; and other miscellaneous ditching jobs. Powered by a 47-hp gasoline engine, it has a top digging speed of 1,308 feet per hour.

The trencher is mounted on Buckeye nonclogging self-cleaning crawlers which have a spring release to prevent damage. The left-hand crawler is adjustable 8 inches vertically to enable the unit to work on hillsides or with one crawler in the gutter and the other on the roadside.

Cutting equipment consists of replaceable rooter bits wedged into cast alloy-steel buckets. The boom is of two-piece box construction. Wear plates at the top and bottom of the boom lengthen the life of the boom and chain. Head shaft and tail shaft are split for easier servicing. They are sealed against dirt and they run on antifriction bearings. An 18 x 48-inch conveyor is used to deposit spoil on either side of the ditch. Two dirt plows are provided to keep the immediate ditch bank free of spoil so that men can work near the bank without danger of kicking spoil back into the ditch.

A shear-pin safety coupling is installed on the excavator differential shaft to protect the digging elements in the event that the machine hits a large buried object. Ground bearing pressure on the unit is 6.1 psi. All transmissions are fully enclosed and sealed against dirt. The boom is lowered and raised by means of a self-locking worm hoist which is said to lend itself to positive boom control at all times.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 105.

Form-Engineering Catalog

A new 54-page catalog, No. 1950, on form engineering has been issued by Williams Form Engineering Corp., 1501 Madison Ave. S. E., Grand Rapids 7, Mich., manufacturer of accessories for concrete forms. It includes detailed information on just about every product originated and developed by Williams for form work, including form clamps, wale supports, couplings, corner wale clamps, stud locks, wale rods, brackets, wing nuts, tie rods, flexible bearing brackets, pigtail anchors, and miscellaneous form hardware.

The catalog includes specifications and features of Williams ties and spreaders and tells how to design forms economically with the company's Super-Hi tensile steel form clamps. Convenient tables make it possible to determine rapidly the proper spacing of horizontal and vertical clamps, and wales and studs. Features of the Vibra-Lock clamp, applicable for all types of dams, bridges, and battered walls, are given in detail. Seven pages are devoted to the design and construction of small retaining walls.

This booklet also provides a wealth of data incidental to form engineering. It includes details on grout and hod guns, form designs, form-pressure tables, soil-bearing values, dam construction, and an index of literature on concrete prepared by the Portland Cement Association.

This literature may be obtained from the company. Or use the Request Card at page 16. Circle No. 112.

Mack's Golden Anniversary

Mack Trucks, Inc., launched its golden-anniversary celebrations June 22 at its Allentown, Pa., plant. After a luncheon at the Lehigh Country Club, guests watched Allentown Mayor D. V. Hock christen the first Mack Model A truck to come off the production line. The Board of Directors met in Allentown the same afternoon for the first time in the company's history. Other ceremonies this year will mark Mack's half century of activity.

Diesel-Tractor Catalog

Two new pieces of literature on diesel tractors have been prepared by the Caterpillar Tractor Co., Peoria 8, Ill. The first is a broadside on the Caterpillar D7, an 81-drawbar-hp unit, with on-the-job photos and a 10 x 20-inch cutaway drawing.

The second is a 16-page booklet entitled "Built To Live", which tells the stories of veteran Caterpillar diesels still producing.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 123.

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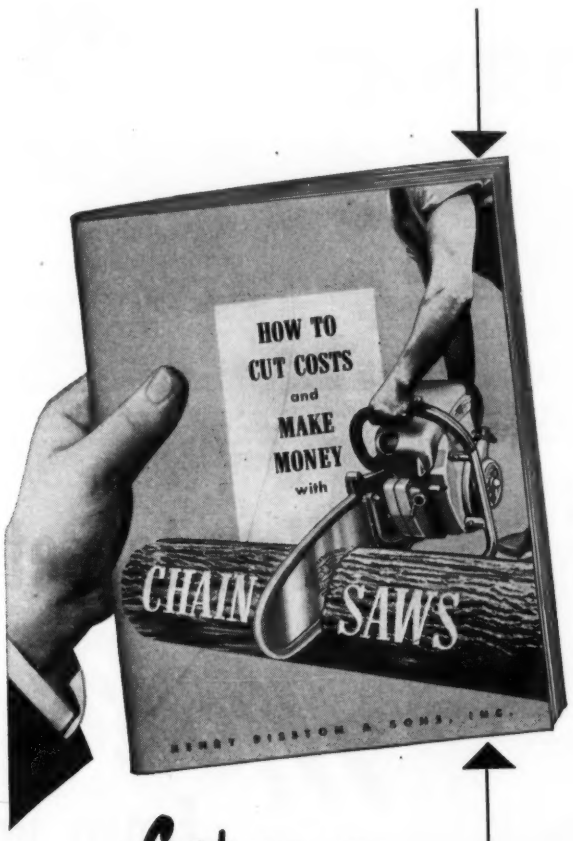

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Dredged Sand Drains And Fills Road Area

Mandrels Driven and Filled With Sand, Then Withdrawn Leaving "Wick" to Drain Marshes; Sand Fill, Too

✦ ONE of the most difficult places in which to construct a highway is through a marsh—especially a modern superhighway that will, when completed, carry the heaviest traffic in the country. The superlative is not amiss when speaking about New Jersey traffic in the great metropolitan and industrial eastern sector. State 25-U. S. 1 route now has the highest traffic count in the United States. The road being built paralleling it on the east is sorely needed to relieve that heavy congestion. The only possible location of this added artery is right where it is now taking shape—in the meadows and marshes of coastal New Jersey—for any favorable terrain in this area is already occupied.

So when the New Jersey State Highway Department decided to build Route 100, an 8-lane freeway, the section in Union County from Elizabeth south to the Rahway River presented some grave problems. In the ever-changing highway picture, this stretch of construction now seems destined to form part of New Jersey's new Turnpike, a 118-mile modern toll road that will cross the state from one end to the other. Sections 4-A, 4-B, and 4-C will be taken over by the Turnpike Authority as soon as approval has been obtained from the Bureau of Public Roads.

Toll or free, the construction is unique on two counts: (1) sand drains stabilize the roadway embankment, and (2) sand for the fill is pumped from the floor of the Atlantic Ocean off Coney Island, N. Y., by an ocean-going hopper dredge, and sailed to New Jersey to provide suitable road material. Not to be overlooked in any unique type of construction is the fact that the State saved $667,144 on this one contract because of the pioneer work of the Highway Department in the use of sand drains.

Choice of Methods

The contract under discussion, known as Section 4-A, is 1.2 miles long, and is located in the city of Linden, beginning at Wood Avenue and running north to Morse's Creek. On the way it crosses Pile's Creek and another small stream. Its 400-foot right-of-way is immediately west of the tracks of the Central Railroad of New Jersey. The successful bidder was the Construction Aggregates Corp. of Chicago and New York, with a low estimate of $1,253,833 for the sand-drain method whereby the highway would be built without resorting to the costly removal of muck and subsequent backfill.

Contractors were permitted to bid on the alternative method of removing the inferior soil and replacing it with selected material. The low bid on this

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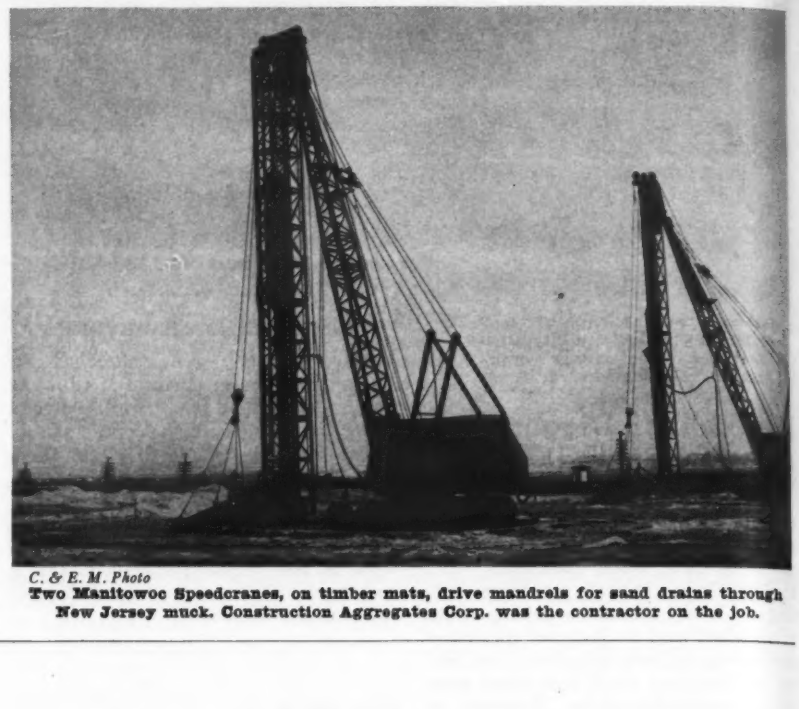
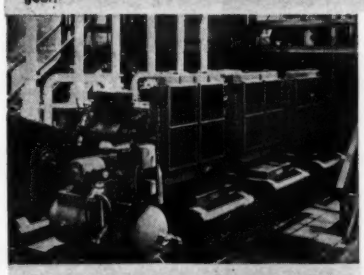


C. & E. M. Photo
Two Manitowoc Speedcranes, on timber mats, drive mandrels for sand drains through New Jersey muck. Construction Aggregates Corp. was the contractor on the job.

LOCOMOTIVES—Repowered with GM Diesel Torque Converter unit, this 20-ton locomotive hauls double the tonnage without ever shifting into low gear.

HOISTING—Converted from steam to GM Diesel Torque Converter power—estimated operating savings will pay repowering and overhaul cost in less than two years.

EARTH MOVING—Two 190 H. P. GM Diesel Torque Converter units give 34-ton Euclid 1-FFD rear dump a speed of 23.4 m.p.h. with full load.



DRILLING—"½ faster than with original engines," says owner of rig repowered with 3 GM "Twin" Diesel Torque Converter units.

LOGGING—Powered with GM Diesel Torque Converter unit, this Washington Iron Works yarder has yarded 140,000 bd. ft. per day.

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Dept. A, 321 N. Justine St., Chicago 7, Ill.

New Jersey Highway Department Photo

A skip attached to a Speedcrane driving rig empties sand into a mandrel, which will be completely filled by the time it is driven to refusal.

option was $1,920,977. Other contractors' estimates, however, on the sand-drain type of construction ranged above $2,000,000.

First step in the sand-drain method was the placing of a 3-foot blanket of sand, 350 feet wide, to provide a "working platform" for the equipment used in the installation of the drains. Each drain was placed by driving a closed-end mandrel through the sand blanket and underlying muck and silt to the required depth. Sand was poured into the mandrel which was then withdrawn, leaving the sand in place to act as a drain.

With the drains in place, the roadway area was loaded with sand fill; the amount of material placed is governed by the rate of settlement and the pore pressure. The latter term indicates the pressure on the water in the underlying soil due to the embankment load. As the load is applied by the addition of fill, the muck is compressed, and the water is forced from the muck into the sand drains. The water flows up through the sand drains and sand blanket, escaping at the side of the fill.

Deep-Sea Dredging

The main items in the contract were 344,000 cubic yards of sand for the "working platform" blanket, 310,464 linear feet of vertical sand drains; and 852,931 cubic yards of borrow. Since the Jersey meadows are devoid of suitable road-building material, sand was dredged from the Atlantic Ocean, the nearest available source of supply, and transported over water to the job site.

Both the sand blanket and overlying fill were the same material, dredged out of Lower New York Bay off the shores of Coney Island. A slightly coarser sand was used in the drains. This material also came from the ocean floor farther down the coast off Sandy Hook, N. J. All dredging was done by the contractor's sea-going hopper-dredge Sandchief, a 2,250-ton craft formerly owned by the Department of the Army, Corps of Engineers, and used for maintaining the channel at the mouth of the Mississippi River. The new owner completely overhauled it for this job.

The Sandchief is 271 feet long and carries 2,100 cubic yards of sand in its two holds, forward and aft. The dredge is the "dust-pan-type", having suction lines at each side which are lowered to the ocean floor. Sand and water are sucked into the holds by a vacuum pump, with the water flowing back into the sea as the vessel is filled with the packed material. Dredging was usually done in 30 feet of water. Work was continuous 24 hours a day, 7 days a week, the dredge averaging two trips a day since a round trip to Coney Island and back took around 12 hours.

Both the sand for the blanket and fill and the sand for the drains is clean, free of organic matter, and is within the following gradation limits:

Sieve Size	Per-Cent Passing	
	Sand Drain	Sand Blanket
½-inch	80-100	80-100
No. 8	40-100	30-100
No. 30	20-30	.....
No. 50	0-30	.....
No. 80	.....	0-20
No. 100	0-3	.....
No. 200	.....	0-3

Working Platform

Loaded with sand, the dredge sailed from Lower New York Bay up the Narrows, then through Kill Van Kull along the north side of Staten Island to Arthur Kill, then south along the west side of the island to a dock which the contractor built on the Jersey side of the water. From the ship a 20-inch discharge line made up of 20-foot length of Naylor Lockseam Spiralweld pipe was laid with a maximum length of 2 miles to the job site. At one point the line passes under the Central Railroad of New Jersey tracks. Water was added to the sand from the hold to permit the pumping of the material as hydraulic fill. The per cent of solids varied from 20 to 50 according to the length of the discharge pipe, the greater amount of solids being pumped when a shorter line was in use.

Out over the swamp 53 settlement tables were built so that a check was obtainable at all times on the vertical

(*Continued on next page*)

WINSLOW—PORTABLE TRUCK SCALE

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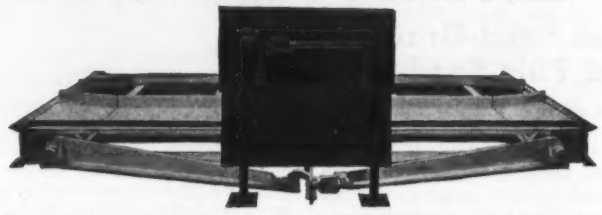

For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site.
Capacities: 15-18-20-30 Ton—Write us for your nearest distributor

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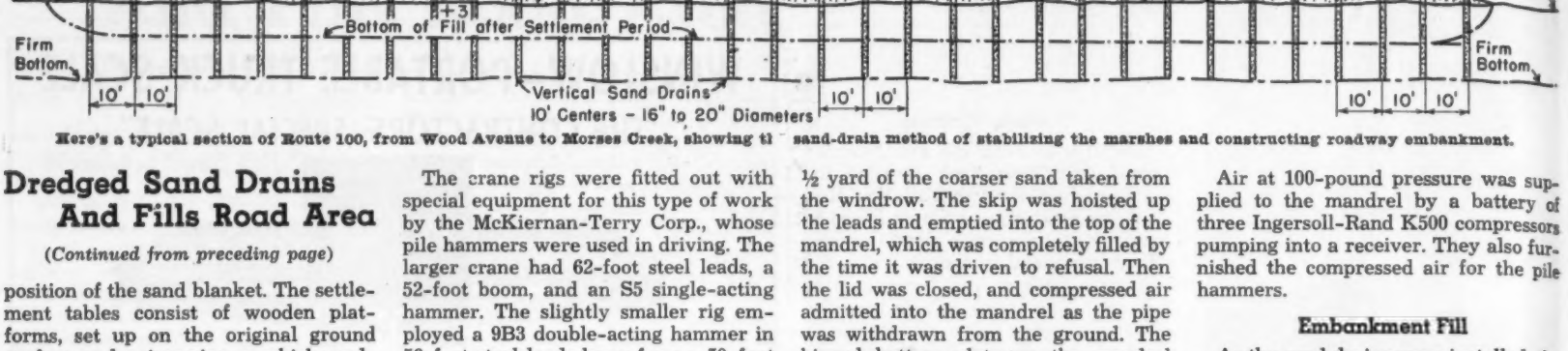

Here's a typical section of Route 100, from Wood Avenue to Morses Creek, showing th sand-drain method of stabilizing the marshes and constructing roadway embankment.

Dredged Sand Drains And Fills Road Area

(*Continued from preceding page*)

position of the sand blanket. The settlement tables consist of wooden platforms, set up on the original ground surface, and a riser pipe on which readings are taken periodically to determine the rate of settlement. The sand was pumped in evenly over the entire area, with Y-connections at the end of the discharge line so as not to overload at any one point. The discharge water ran off the sides as the 3-foot blanket was built up inch by inch.

When this working platform of sand was obtained, the dredge brought in the slightly coarser sand for the drains. This material was laid down the center line of the blanket in a windrow 3 feet high, so as not to overload the thin sand layer by stockpiling it in one location. Underneath this sand blanket the muck varies in thickness from 8 to 19 feet on top of firm bottom land. In this area industrial chemical plants discharge a liquid waste over the Linden meadows. This material gradually dries out and hardens into a powder that in places averages 4 feet in depth over the marshes.

Sand Drains

The sand drains are installed over the entire area on 10-foot centers both ways. They are 18 inches in diameter x an average depth of 16 feet, with a few going down to 19 feet. The mandrels used in the installation consisted of a 25-foot length of 16-inch steel pipe with the lower end closed by a steel flap that remained shut during the driving. Two Manitowoc Speedcranes, working from timber mats, drove the mandrels through the 3-foot sand blanket. The weight of the hammers forced the mandrel through the layer of muck, after which driving was resumed until the mandrel had penetrated about 3 feet into the solid bottom.

The crane rigs were fitted out with special equipment for this type of work by the McKiernan-Terry Corp., whose pile hammers were used in driving. The larger crane had 62-foot steel leads, a 52-foot boom, and an S5 single-acting hammer. The slightly smaller rig employed a 9B3 double-acting hammer in 56-foot steel leads hung from a 50-foot boom. To each lead a 1½-yard sand skip was attached for loading the mandrel through a special cap that was part of the working design pattern.

After the mandrel was driven about 10 feet below the top of the sand blanket, a Traxcavator loaded the skip with ½ yard of the coarser sand taken from the windrow. The skip was hoisted up the leads and emptied into the top of the mandrel, which was completely filled by the time it was driven to refusal. Then the lid was closed, and compressed air admitted into the mandrel as the pipe was withdrawn from the ground. The hinged bottom plate on the mandrel permitted the sand to flow into the hole and the compressed air insured complete ejection of the sand as the pipe was lifted out. Thus the hole was entirely filled with sand, and the muck was kept out of the drain. Deep holes required one yard of sand.

Air at 100-pound pressure was supplied to the mandrel by a battery of three Ingersoll-Rand K500 compressors pumping into a receiver. They also furnished the compressed air for the pile hammers.

Embankment Fill

As the sand drains were installed, the water rose out of the muck, which then gradually hardened as its moisture content lessened. The sand drains acted as a wick, drawing up the water and dissipating it out over the sand blanket. This naturally caused a sinking of the

(*Continued on next page*)

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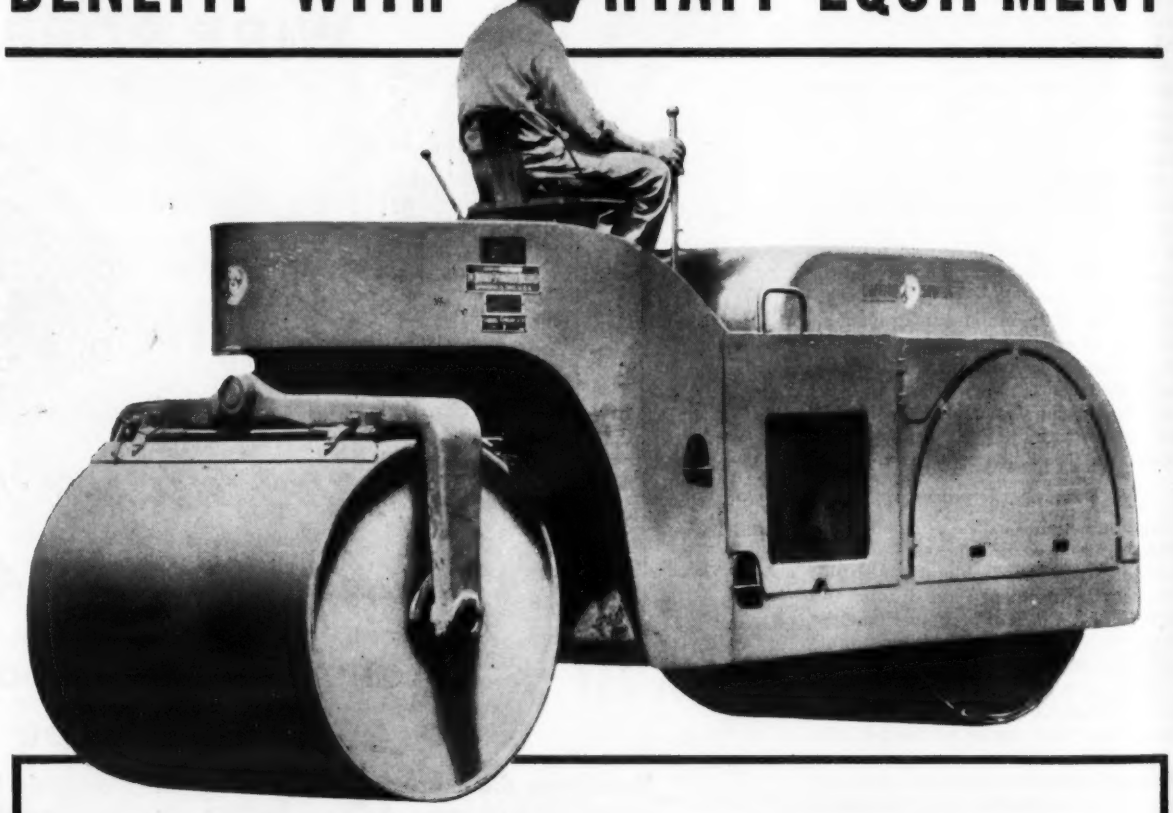

For the rolls and wheels of Buffalo-Springfield Rollers here are some of the reasons why Hyatt Roller Bearings were chosen as standard equipment:

1. Standard shafting may be utilized with no machining of the shaft necessary.
2. Simplified assembly.
3. Less parts required.
4. Better lubricant distribution.
5. No bearing adjustments need be made.
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Advantages like these, for both the machine builder and user alike, demonstrate why Hyatt Roller Bearings are being so extensively "built in" to all kinds of construction equipment. Hyatt Bearing Division, General Motors Corporation, Harrison, N. J.

HYATT ROLLER BEARINGS

blanket, but this was a general settlement over the entire area as the muck slowly dried out. This dewatering permitted the placing of more sand fill on top, and the gradual building up of the embankment which averages 15 feet in height when completed. The material was pumped out from the Sandchief as hydraulic fill.

The embankment was built up in 1,000-foot sections which were enclosed by sand dikes along the sides and at the ends. The retaining dikes were thrown up by a bulldozer, and outlets of three to four 20-inch pipes were constructed at the sides for draining off the water pumped in with the sand. Sections were built up in 2-foot lifts at a time so as to keep the settlement under control. The sand, as it dried out, was evenly distributed by an 8-yard scraper, pulled by an Allis-Chalmers HD-10 tractor, and two dozers—an International TD-9 and an A-C HD-10.

The rate at which the embankment was built was carefully controlled so as to hold to a minimum the danger of failure in the underlying soil. Stability stakes, wooden 2 x 2's, were placed outside and parallel to the embankment. Readings as to elevation and alignment were taken on these daily. If movement was detected, the placing of fill in that area was stopped at once until the underlying soil had time to consolidate further and become stable.

Pore-water-pressure gages were also used to tell how much more fill could safely be placed. These aids consisted of wellpoints that were installed at various depths in the underlying soil, and connected through a water-filled closed system to Bourdon gages. When calibrated, these gages read soil pore water pressure at the elevation at which the wellpoints were placed. As indicated earlier, the pore pressure is the pressure on the water in the underlying soil due to the embankment load. Daily readings were also taken at each instrument. The rate of placing fill was controlled to maintain the pore water pressure at a predetermined value. A sudden rise in pore water pressure was an indication that a failure might take place, and fill construction was stopped until the readings returned to normal.

The embankment was overloaded about 5 feet above the profile grade. This was done to give greater settlement in the time allotted before paving than would have taken place with the embankment brought up only to grade. From readings on the settlement platforms, the time to remove this overload is determined.

Other Work

A temporary work bridge was built across Pile's Creek during the construction. A permanent span will be erected over the relocated creek, and also at Morse's Creek whose channel has also been changed.

Construction Aggregates Corp. holds two other contracts on this same superhighway, Sections 4-B and 4-C. Section 4-B, 0.267 mile long, constitutes the north approach to the new bridge spanning the Rahway River. The low bid of $782,124 covers the two main items of 211,571 cubic yards of wet excavation, and 553,842 cubic yards of borrow. On this job the muck was completely removed with a cutter-head dredge, and backfilled with sand pumped in by the Sandchief.

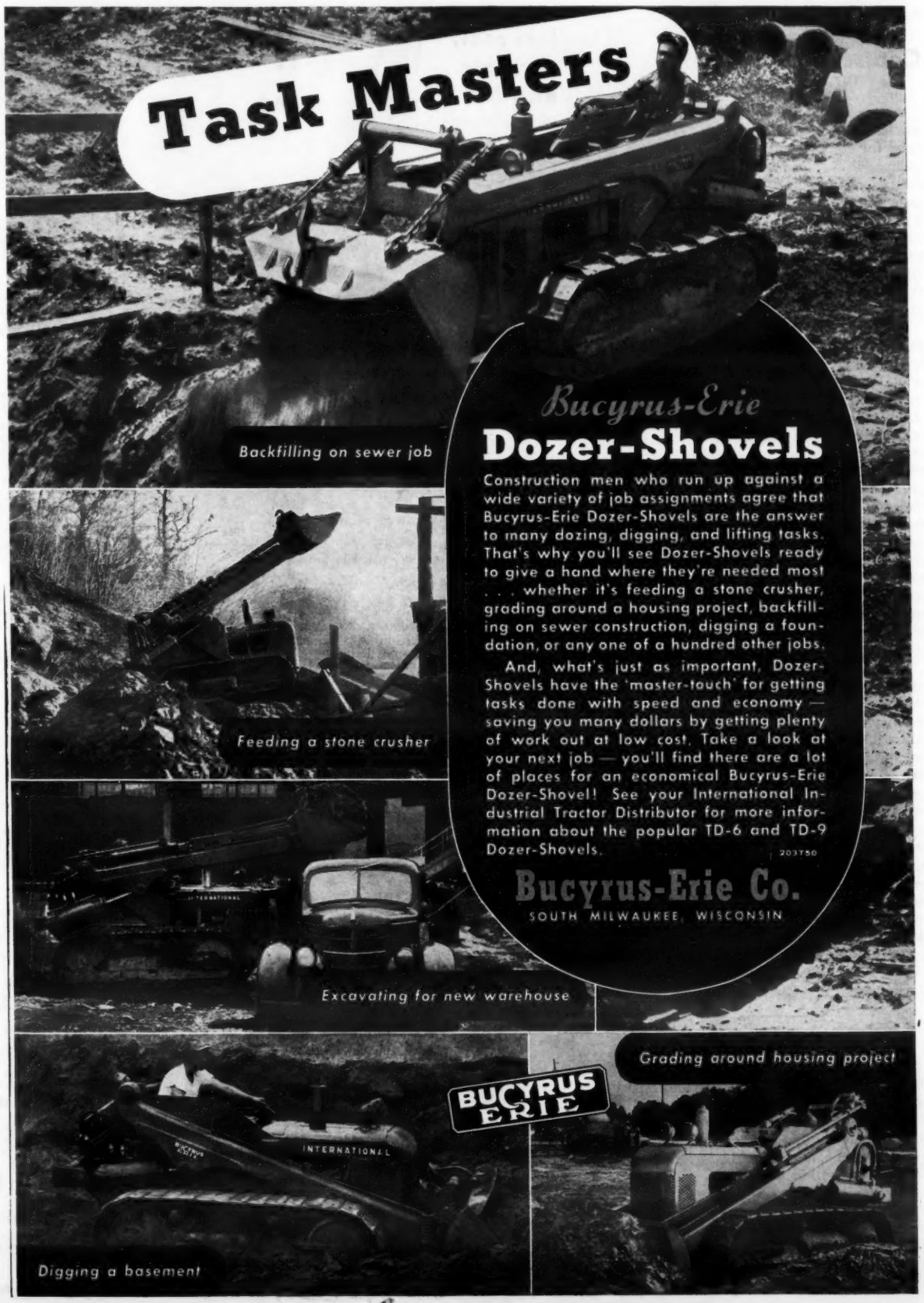
Section 4-C, 0.313 mile long, lies between 4-B and 4-A but adjoins neither because of gaps that were left in the construction continuity due to relocation problems involving a railroad and an oil-tank farm. The sand-drain method was employed here, the major items involved being borrow, 192,021 yards; sand blanket, 63,556 yards; and vertical sand drains, 52,461 linear feet. All three contracts got under way in 1948 and are scheduled for completion the latter part of this year. The colossal task of providing suitable material for building a road is the drawback to speedy construction progress. South of this location several miles of the new highway have been graded where better soils were encountered.

This part of the new route provides a roadbed wide enough for four roadways, all separated by malls. Each roadway will carry two lanes of traffic. The inner roads will accommodate express and the outer roads local traffic. Limited access will prevail, with no traffic lights and no intersections at grade.

(*Concluded on next page*)

C. & E. M. Photo

A battery of three Ingersoll-Rand K500 compressors, pumping into a receiver, furnish the air which forces sand into drain holes as the mandrel pipes are lifted out.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Dredged Sand Drains And Fills Road Area

(*Continued from preceding page*)

Personnel

For Construction Aggregates Corp., Russel Ball is District Superintendent with headquarters in New York City. On the contracts described, James Williams is Superintendent. John Gusland is Captain of the dredge Sandchief. The work force averaged 91, with 42 on the dredge, 22 on shore-fill placing, and 27 on sand-drain installation.

O. J. Porter, Consulting Engineer, of Sacramento, Calif., and New York City, was consultant to the New Jersey State Highway Department during the preparation of the plans for the sand-drain design.

Oscar Vogel is Principal Engineer for the New Jersey State Highway Department on the new construction, under the direction of R. M. Beck, District Engineer, Northern Construction Division. The Department is headed by Ransford J. Abbott, State Highway Commissioner. E. W. Kilpatrick is State Highway Engineer.

Controls and Meters Water for Batching

A new Auto-Stop meter that automatically controls the quantity of water used for concrete batches has been developed by Neptune Meter Co., 50 W. 50th St., New York 20, N. Y. It consists of a Model 432 register mounted on a Neptune liquid meter coupled with a quick-closing valve. This meter, inserted in the line near the mixing equipment, is designed to shut off the flow automatically after a predetermined quantity has been delivered.

Operation is as follows. The tripping mechanism is first set by pushing the buttons on the register until the number of gallons (or pounds) desired shows up on the numeral wheels just above the buttons. The valve is then opened and the operator is free to devote his attention to other jobs. The large numerals on the face of the meter keep pace with the flow, and provide a visual check when delivery is finished and the flow has been automatically cut off. After the delivery, the register is cleared back to zero by turning the reset handle. The small shuttered totalizer near the top of the register keeps cumulative totals from which daily, weekly, or monthly figures can be recorded.

Flow can be stopped instantly at any time by pressing the emergency stop button on the face of the register. This does not affect the meter reading or Auto-Stop setting. The delivery can be continued by reopening the valve, or the register can be reset for a new quantity before continuing. This does not affect totalizer recordings.

The register is easy to keep clean, weatherproof, and dustproof, says the manufacturer. Factory calibration is sealed. The meter is furnished from stock in 1, 1½, and 2-inch sizes with capacities from 30 to 100 gpm. Other sizes are available on request.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 50.

Powder-Actuated Fastener

A new 4-page folder on the Drive-It 300 powder-actuated fastening tool has been put out by the Powder Power Tool Corp., 0719 S. W. Woods St., Portland 1, Oreg. This tool for fastening steel or wood to concrete or steel is designed to provide controlled power and penetration with a single powder charge.

The literature explains the operation of the tool and its application in construction work. It includes illustrations and dimensions for a wide selection of drive pins ranging from approximately ¾ inch to 3 inches in length. The bulletin points out that no drilling or previous preparations are required: a single tool with individual powder plugs provides complete controlled power.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 148.

Upham Opens Offices

After November 1, Charles M. Upham, consulting engineer, will have his permanent office at Suite 606, Cafritz Bldg., 1625 Eye St., N. W., Washington 6, D. C. Since his retirement as Engineer-Director of the American Road Builders' Association, Mr. Upham has had a temporary office for his engineering practice at Suite 102, Willard Hotel, in Washington. He specializes in reports, research, economic studies, investigations, surveys, and finance consultation and representation to business clients; liaison with Government departments; inter-nation representation and specific information service.

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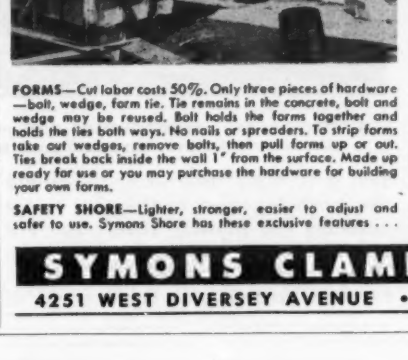

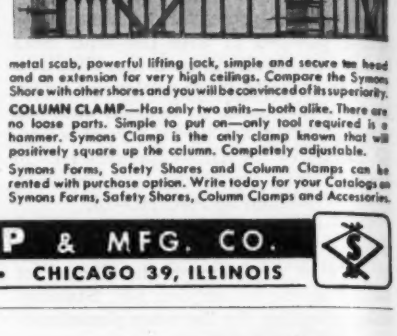

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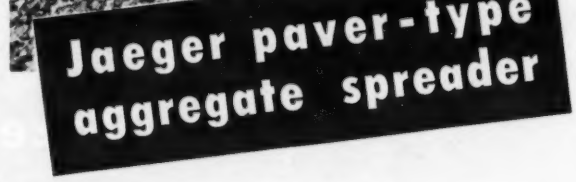

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Lays up to 9" thickness, up to 12½' width, with straightedge accuracy.

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"Teams" with this Jaeger Bituminous Paver: Latest type precision machine for all types of bituminous materials — self-adjusting to widths to 12½', automatic leveling, paves flush to curbs, gutters, operates entirely on subgrade or compacted course. Ask for Catalog BP-9.

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keeps 2 big breakers hitting at top pressure—30% to 40% more output than same tools with 105 ft. of air

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BITUMINOUS PAVERS • CONCRETE SPREADERS AND FINISHERS

The DeWalt Model GS radial-arm saw can be removed from its cabinet and used as a portable power saw.

Radial-Arm Power Saw

A new Model GS radial-arm power saw has been announced by DeWalt, Inc., Lancaster, Pa. The basic unit is mounted on a steel cabinet; total weight is 115 pounds. This lightweight feature, coupled with a new recessed cabinet top design, makes it easy to remove the saw, table, and table base from the cabinet itself and use the saw as a portable unit. The cabinet may be fitted with shelves and drawers for storing tools.

The Model GS is equipped with a ½-hp motor and can cut 2-inch-thick material, cross-cut 12-inch-wide material, and rip to the center of a 43-inch panel. It can do straight and bevel ripping, ploughing, grooving, tenoning, sanding, dadoing, light metal cutting, mitering, cross-cutting, etc.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 67.

Glass-Fiber Joint

An improved nonextruding expansion-joint material, developed to meet the requirements of AASHO Designation M-59-42, is now available in ½, ¾, and 1-inch thicknesses from Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill.

Features claimed by the company for this glass-fiber joint are light weight, little damage in shipping and handling, a combination of inorganic glass fibers and asphalt which will not decompose or rot, low water absorption, and 70 per cent or more recovery when subjected to extreme temperatures.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 98.

Equipment-Repair Parts

A new catalog covering brake linings and clutch facings for shovels, draglines, cranes, tractors, and industrial equipment has just been issued by Grey-Rock Division of Raybestos-Manhattan, Inc., Manheim, Pa.

It describes the various types of Grey-Rock friction materials suitable for the equipment mentioned, and illustrates friction-material locations on typical units. Most of its 100 pages are devoted to data on friction-material sizes, parts numbers of manufacturers, equipment, types of brake bands with which the units are equipped, and Grey-Rock friction-material recommendations for specific parts of various units. The Grey-Rock Division believes that Catalog I-102 is the most complete industrial friction-material catalog that has been issued.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 75.

New Aggregate Plant

New features in the Model 880 Junior B Gravelmaster crushing, screening, and loading plant have been announced by the Universal Engineering Corp., Cedar Rapids, Iowa. The overall height of the unit has been lowered and the screening area increased with a 2 x 8-foot 2½-deck screen. The Junior B also has provisions for the removal of chips. A 10 x 16-inch roller-bearing jaw crusher and an 18 x 16-inch star-gear roll crusher are used. In the Junior B, the power source is mounted on the plant. The plant may be fed by a shovel-loaded hopper mounted on the plant or by a swivel feed conveyor.

New features of the Model 880 Junior B Gravelmaster, made by Universal Engineering Corp., include lower overall height, and increased screening area.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 82.

It's Your Cost-Cutting Combination!

Here's how to really step up the usefulness and profit-making ability of your Oliver Wheel Tractor-Loader. Simply add an Oliver Hydraulic Mower and you get a cost-cutting combination that will be busy virtually all year round. You can install the mower quickly and easily for those few days or weeks of work per mowing month . . . pull it off for the regular run of loading jobs. It's the ideal combination to cut your operating costs.

This powerful mower fits right into your tractor-loader. Cutter bar is driven by the hydraulic pump of the loader so no separate power units are required. Mower will cut anything from thick matted grass to moderate brush—in fact, almost anything that will pass between the knife guards. Hydraulic safety mechanism practically eliminates knife damage. Operator can cut right up to an obstruction . . . hydraulically raise the cutter bar to clear the obstruction...go right on mowing.

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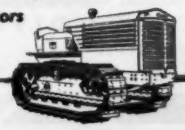

THE OLIVER CORPORATION

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34 No. Clinton St. Chicago, Ill.

Tandem-Axle Trailer Has 40-Ton Capacity

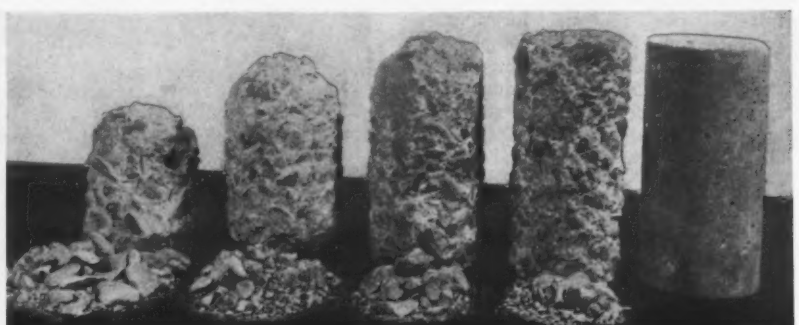
A new heavy-duty tandem-axle low-bed trailer, which has a rated capacity of 40 tons and is within the 8-foot-width limit, has recently been developed by La Crosse Trailer Corp. of La Crosse, Wis. Available with flat or drop-type platform, the new trailer is fitted with eight 10:00 x 15 tires. These 20-ply tires are rated at 50,960-pound capacity under the new 20-mph ratings issued by the Tire & Rim Association, the manufacturer says.

The trailer is equipped with "walking beams" supporting the rear axles. These are designed to give maximum horizontal and vertical oscillation of each wheel (about 10 inches both ways) for uniform distribution of the load over any type of road or terrain. The trailer is fitted with 12¼ x 6 constant-rise S cam brakes, actuated by either air or vacuum. The gross load is distributed 37,440 pounds on the king pin and 50,960 pounds on the rear axles. Total trailer weight is 11,200 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 79.

Armco Promotes Shafer

George E. Shafer is now Chief Engineer of Armco Drainage & Metal Products, Inc., a subsidiary of Armco Steel Corp., Middletown, Ohio. He has also assumed responsibility for the Product Engineering and New Product Development Departments. Carleton C. Clark and John R. Wilks, former Managers of these departments, recently retired. Mr. Shafer will continue to be in charge of the Sales Engineering Department.



In tests conducted by the producers of Hydropel, the concrete cylinder at right, which contained the asphalt emulsion admixture, was not appreciably damaged after 40 cycles in and out of sodium sulphate. The cylinder next to it had the same type of cement, plus 4 per cent entrained air, but no admixture—it failed in 18 cycles. The cylinder way at the left, with the same type of cement, but no air entrainment and no admixture, failed in 9 cycles. The other two failed after 13 and 15 cycles.

Asphalt Admixture Improves Concrete

Research engineers in the asphalt industry believe they have developed a product which, when used in concrete, will reduce permeability, give high chemical and impact resistance, increase dimensional stability, prevent segregation, and improve bond with previously placed concrete. When mixed in amounts from 1 to 1½ gallons per sack of cement in structural concrete, this emulsified-asphalt product known as Hydropel forms a thin water-repellent coating internally absorbed by the concrete.

The new product is a chocolate-brown liquid of about table-cream consistency, which contains 55 to 60 per cent of finely ground hard paving asphalt. It is marketed by Stancal Asphalt & Bitumuls Co. west of the Rocky Mountains, and by the American Bitumuls Co. east of the Rocky Mountains. Both companies are located at 200 Bush St., San Francisco 4, Calif.

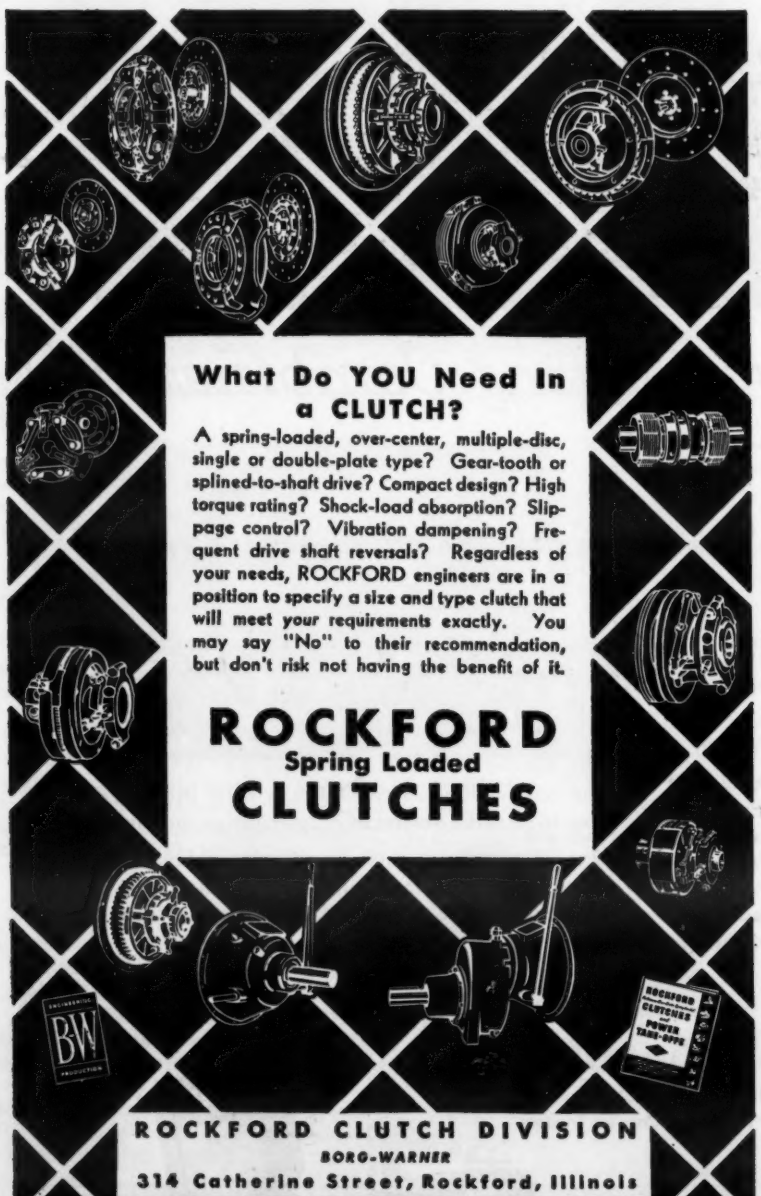
Hydropel is added to the mixing water, or put in the batch after the mixing water has been added. Depending upon the mix design, it has been the practice to maintain workability by withholding an amount of water equivalent to the full volume of added emulsion for high-slump concrete, and one-half the volume for low-slump concrete.

The admixture is suitable for concrete for wharves, coastal bridges, dams and spillways, structures in known alkaline-soil areas, irrigation ditches, salt-concentration ponds, chemical plants, oil refineries, etc.

Further information may be secured from the manufacturer. Or use the Request Card at page 16. Circle No. 73.

Lincoln Personnel News

A. F. Boucher has been transferred from his position as District Manager in Milwaukee for the Lincoln Electric Co. of Cleveland, to become District Manager for the company in Detroit. I. R. Bartter, formerly District Manager in Grand Rapids, Mich., has been transferred to Milwaukee to fill the place left by Mr. Boucher.


What Do YOU Need In a CLUTCH?
A spring-loaded, over-center, multiple-disc, single or double-plate type? Gear-tooth or splined-to-shaft drive? Compact design? High torque rating? Shock-load absorption? Slippage control? Vibration dampening? Frequent drive shaft reversals? Regardless of your needs, ROCKFORD engineers are in a position to specify a size and type clutch that will meet your requirements exactly. You may say "No" to their recommendation, but don't risk not having the benefit of it.
ROCKFORD
Spring Loaded
CLUTCHES
ROCKFORD CLUTCH DIVISION
BORG-WARNER
314 Catherine Street, Rockford, Illinois

Make Trenches Safe for Workmen

Unexcelled for safe and economical bracing of all trench and excavation jobs . . . Duff-Norton Trench Braces are of strong construction . . . easy to install, easy to maintain when not in use. Write today for full information and proposal on your requirements.

A. This type is supplied complete with pipe (1½" or 2") in lengths from 16" to 60" to suit your needs.

B. Steel fittings only are supplied without pipe if desired. Used with 1½" and 2" pipe.

C. Steel timber brace fittings are furnished without timbers for use with 4" x 4"—6" x 6" and 8" x 8" timbers.

See your local distributor or write for Catalog 203-D

THE DUFF-NORTON MANUFACTURING CO.
MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA. — CANADIAN PLANT, TORONTO 6, ONT.
"The House that Jacks Built"

Levee, Floodwall Rise on the Ohio

Borrow-Pit Loader Speeds Dirt Handling for Fills; I and T-Walls of Concrete Used in Tight Stretches

By WILLIAM H. QUIRK,
Eastern Editor

C. & E. M. Photo
Big gun in the levee dirt-moving at New Albany, Ind., was this Euclid loader pulled by an HD-19—here it loads a bottom-dump Euclid.

✦ CONSTRUCTION activity at New Albany, Ind., right across the Ohio River from Louisville, Ky., will give that city flood protection in the form of a dirt levee and concrete wall. Levee sections are built in those areas where space along the river permits large embankments. Walls are erected where streets come close to the shore line, thus offering little room for the wider type of protection. The new work is an Ohio River Basin flood-protection project of the Corps of Engineers, U. S. Army, Louisville District, and is divided into three parts.

Part 1 begins at the east side of New Albany near the right bank of Silver Creek, which empties into the Ohio at a point upstream of the city. The protection extends downstream, roughly paralleling the creek, and ends at the tracks of the Pennsylvania Railroad. It is a mile long, and includes levee embankment, concrete floodwall, and a piece of high ground where neither is needed. A contract for this portion of the work was awarded by the Corps of Engineers to Hart & Hart of Providence, Ky., on a low bid of $407,721. Its work was completed in the two construction seasons of 1948 and 1949.

Starting from high ground, the bulk of the protection on this part was dirt levee, with the wall portion only about 200 feet long. This contract also included three highway gate closures and a closure for the Baltimore & Ohio Railroad, together with the necessary drainage structures and sewer pipe. The levee sections ranged from 12 to 18 feet in height.

Levee and Wall

Part 2 picks up at the lower end of the first contract and extends downstream for 1¼ miles. This portion of the project was awarded to Vest & Bartell Co. of Cincinnati, Ohio, on a low bid of $958,385. Construction began in July, 1949, and is scheduled for completion this November. The job starts about 800 feet west of Silver Creek on the north side of the Pennsylvania railroad, and roughly parallels the creek and the river. It crosses under the Kentucky & Indiana Terminal Railroad bridge across the Ohio, and dead-ends at the intersection of 15th and Water Streets in New Albany.

No work has been undertaken as yet on the flood protection along the western end of the city, which will start at the end of Part 2 and continue downstream until high ground is reached at the highway embankment fill. This work will contain both levee and wall. Together with the necessary system of pumping plants, it will completely protect New Albany from high water such as covered large portions of the city in 1937 and again in 1945.

The main features of the Vest & Bartell Co. contract for Part 2 include 1,000 feet of concrete wall, about a mile of

(*Concluded on next page*)

Davis Construction Company, Hicksville, N. Y., has recently completed the new Veterans Memorial Highway between Commack and Patchogue, L. I. The photographs show part of the Davis earth-moving equipment on this job. Cost of the new through-way, $1,500,000.

"Straight down the line we get better equipment performance with Gulf Quality Lubricants and Fuels"

says Charles Davis, General Field Superintendent

"We have used Gulf gasolines, Diesel fuels and lubricants in our entire fleet of equipment for several years," says Mr. Davis, "and always feel safe and sure that we're getting the finest quality and service."

There are three solid reasons why petroleum products bearing the familiar Gulf Orange Disc are on the job for so many leading contractors. One is performance—the kind of lubrication and fuel efficiency that insures smooth, dependable operation and low maintenance costs. Another is the high type of engineering service Gulf provides to assure the most suitable lubricants and fuels for every unit and operating condition. Third, Gulf's prompt delivery service.

Write, wire, or phone today and arrange to use Gulf lubricants and fuels on your next job. They are quickly available to you through 1200 conveniently located warehouses.

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HOOKS, TONGS GRIPS and SLINGS

HANDLE HEAVY OBJECTS SAFELY!

A Downs "Grab" eases every contractor's pulling or handling job. Get Downs pile driving and pulling units, ripping hooks, beam tongs, slings and hooks for odd shaped objects. Write for illustrated catalog No. 200B.

DOWNS CRANE & HOIST CO.
540 W. VERNON AVENUE
LOS ANGELES 37, CALIF.
Electric Cranes • Hand Cranes • Jib Cranes • Sheaves • Sheave Blocks
Plate Grips • Plate Hooks • Crane Trolley Hoists • Crane Wheels • Crane End Truck Units • Jib Crane Fittings • Automatic Mechanical Load Brake Crane Hoist Blocks

Levee, Floodwall Rise on the Ohio

(*Continued from preceding page*)

levee, a highway and a railroad closure structure, 6 good-size drainage works from 36 to 84 inches in diameter, and ½ mile of sewer pipe. The levees are from 10 to 40 feet in height, and are placed in 8-inch lifts with compaction achieved by six passes of a sheepsfoot roller. They have a 12-foot crown, and 1 on 3 side slopes from the crown down to a point 25 feet below the top. From there the slope is 1 on 4 to the toe on both river and land sides. The average width through the base is 162 feet.

I and T-Wall Sections

Both I-wall and T-wall sections are used on Part 2, with the I-wall type generally found in the transition stretch between the levee and the long T-wall sections. The T-wall is supported on a solid foundation, while the I-wall rests on a row of steel sheet piling, either MA-22 or Z-32 sections, which project 5 feet into the wall.

The I-walls are up to 14 feet high with a 1-foot 3-inch top width. Both sides are battered ½ inch to the foot down to an L-shaped toe, 3 feet 6 inches wide. Both types of walls are heavily reinforced, and have a net top grade of elevation 464, which is the same as that of the levee. The walls are built in 20-foot monoliths.

The T-walls have a maximum height of 23 feet. For this particular section, the top width is 1 foot 6 inches, with a batter on both sides down to a bottom width of 2 feet 3 inches. This is supported on a footing 22 feet 9 inches wide x 2 feet thick. At the riverward edge is a toe wall 7 feet 8 inches deep. Both contractors used transit-mixed concrete, from either Louisville or New Albany, in the construction of the concrete walls.

Dirt Embankment

Vest & Bartell Co. sublet the earthwork items in its contract to Terry & Steadman Co. of Bay City, Mich., which had also been engaged across the river on Louisville levee protection. Material was obtained from three riverside borrow pits, entailing an average haul of ¾ mile. The big gun in the dirt-moving set-up was a Euclid loader pulled by an Allis-Chalmers HD-19 tractor. Another similar tractor was also available in the pits for pushing when necessary. The loader filled a fleet of bottom-dump Euclids with an average 16 yards of dirt. There were nine Euclids on the job, but only seven worked at a time, the other two being held in reserve.

As the material was dumped it was spread by Caterpillar dozers—a D8 and a D7—and compacted by a LeTourneau sheepsfoot roller pulled by an International I-9 tractor. A pair of Allis-Chalmers AD-5 motor graders shaped the final grade. When necessary the fill embankment was wet down with water from an FWD 2,000-gallon tank truck. Where muck pockets were encountered, they were dug out by a Northwest No. 6 dragline equipped with a 60-foot boom and a Page 2-yard bucket.

The contractor worked two 8-hour shifts on the dirt work, moving an average of 4,000 yards of material in a shift. For night work on the 3 p. m. to 11:30 p. m. shift, the loader carried its own floodlights. The fill area was illuminated with Onan 10-kw light plants. Each plant supplied current for six 15,000-watt bulbs. Three stands, each carrying two of these bulbs, were strung out at the side of the fill about 125 feet apart.

Quantities and Personnel

The major items on the two flood-protection contracts at New Albany, Ind., include the following:

Item	Hart & Hart	Vest & Bartell Co.
Levee embankment	240,000 cu. yds.	518,000 cu. yds.
Excavation stripping	60,000 cu. yds.	99,600 cu. yds.
Concrete	1,380 cu. yds.	3,670 cu. yds.
Cement	1,700 bbls.	4,600 bbls.
Reinforcing steel	108,315 lbs.	370,000 lbs.
Steel sheet piling	38,066 lbs.	1,310 sq. ft.

Altogether a force of over 150 men was employed on both parts of the protection project. For Hart & Hart, Maurice P. Thompson was Superintendent, while Walter C. Miller was Superintendent for Vest & Bartell Co. Terry & Steadman Co. was represented on the job by O. L. Jones and Tom Hudson, Day and Night Superintendents.

For the Corps of Engineers, U. S. Army, Robert E. Ledford was Resident Engineer. The Louisville District, which exercised supervision over the construction, is headed by Col. J. L. Person, District Engineer. Lt. Col. W. W. Wilson is Executive Officer.

Motor-Grader Bulletin

Features, specifications, and views of Huber G-801 and G-802 motor graders are offered in a 12-page bulletin issued by the Huber Mfg. Co., 202 N. Greenwood St., Marion, Ohio. It explains that the hydromechanical controls on the graders provide ease of operation, smooth response, and positive control of the blade. It also describes the parallel action of the front end, designed to reduce strain on the wheels and tires; the oversized front-wheel spindles; the heavy-duty tandem drive; and the high front-axle clearance.

Photographs illustrate blade positions for high bank cuts, low bank slope, reverse bank slope, shoulder finishing, flat-bottom ditching, and reverse blade use. Complete engine specifications are given for the Hercules 130-hp diesel which powers the Model G-801 and the International 100-hp diesel which powers the Model G-802.

This literature may be obtained from the company by requesting Bulletin G-139, or by using the Request Card at page 16. Circle No. 86.

Represents Belt-Fastener Co.

In New England and New York, Lester B. Coleman now represents Flexible Steel Lacing Co., Chicago manufacturer of belt fasteners. His home is in Roxbury, Conn.

CHAMPION
WORKIN'EST
Here are some of the exclusive features that give the TD-24 its matchless work capacity:
1. 180-h.p. International diesel engine with gasoline-conversion starting and unmatched "lugability".
2. Synchromesh transmission for easy shift-on-the-go operation; plus eight speeds forward and eight reverse.
3. Planet Power drive, smooth and rugged, for instant speed change up or down one gear without declutching.
4. Planet Power steering to provide power on both tracks in gradual turns and permit feathered or pivot turns.
5. Separate reverse lever for quick change of direction of travel in any of the eight transmission speeds.
6. High-speed track assemblies with new recoil mechanism that holds front idlers in position against full-load track pull.
The NEW TD-24
CRAWLER TRACTORS • WHEEL TRACTORS
DIESEL ENGINES • POWER UNITS

New PCA Research Labs

Civilization's best chance of surviving an atomic war, short of dispersal of its cities, is to make maximum use of concrete in building those towns and cities, according to Dr. A. Allan Bates, Vice President for Research and Development, Portland Cement Association. Speaking at the dedication of the Association's new $3,000,000 research and development laboratories, Dr. Bates said, "Reinforced-concrete structures, properly designed, possess a unique combination of impenetrability to deadly atomic radiation, resistance to blast destruction, safety against fire, and . . . economic feasibility."

Following the ceremonies, visitors inspected the two buildings of the new research center on W. Harrison St. in Skokie, Ill., about 16 miles northwest of Chicago. The buildings house more than 30 individual laboratories devoted to research in portland cement and concrete. Testing equipment ranges from a 1,000,000-pound compression machine to instruments capable of measuring the surface area of a single grain of cement. In the controlled-temperature and humidity rooms, climates from arctic cold to equatorial heat or desert dryness can be simulated. The two buildings of architectural concrete provide approximately 98,000 square feet of usable floor space and triple the Association's former research facilities in its general headquarters building, 33 W. Grand Ave., Chicago.

A partial list of past PCA research projects includes the water-cement ratio principle of proportioning concrete mixtures, soil-cement, air-entraining portland cement, pressure grouting, precast concrete, etc. Among the most interesting of current studies are those concerned with prestressed concrete.

Amsco Sales Manager Dies

Bradley S. Carr, Sales Manager of the Dredge Pump Department of American Manganese Steel Division of American Brake Shoe Co., died last May after a heart attack. He had been with the company since 1917.

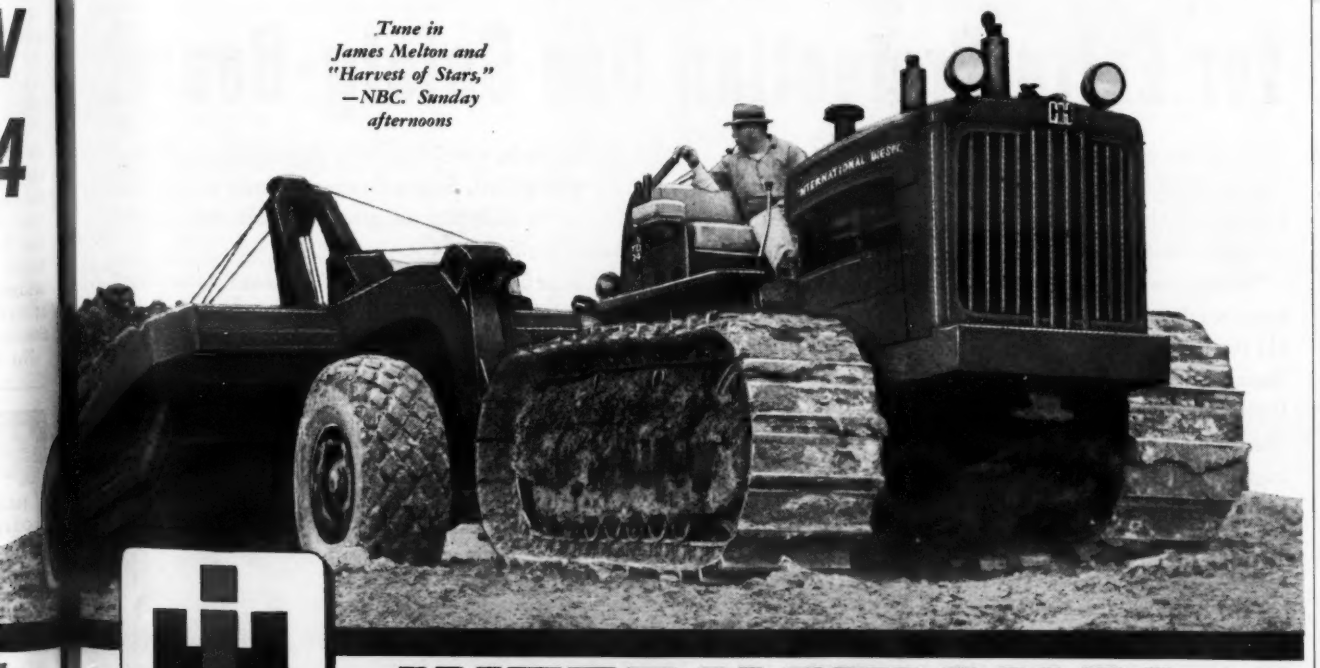
Perry I. Nagle has been named to fill the vacancy. He will serve as Sales Manager for both industrial and dredge pumps.

# of Crawlers
TRACTOR ON ANY JOB

● *"THE TD-24 is definitely outhauling every other tractor on the job. It will do so much work that we are sure our job costs will show a great saving!"* That's the report of the foreman on the 247,000-yd. University of Maryland stadium project. ● *"I don't have to stop on any grade,"* the operator reports, *"and we have 25% or better on this job. Why, I just go up in 4th gear easy while the other tractors have to switch to low to make it."* And the TD-24 hauls a 17-yard scraper, heaped! ● Yes, the TD-24 is the "workin'est tractor" on any job. Yet, its operator is the worker with the easiest day! See your International Industrial Power Distributor. Get a TD-24 demonstration. Discover how you, too, can save job time, cut costs, earn extra profits.

INTERNATIONAL HARVESTER COMPANY • Chicago

Tune in James Melton and "Harvest of Stars," —NBC. Sunday afternoons



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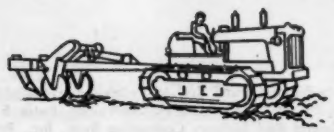
INTERNATIONAL INDUSTRIAL POWER



New Recording System Cuts Business Costs

A nation-wide plan for bringing modern business-machine methods within the financial reach of small businessmen—contractors', consulting engineers', or architects', offices, for example, has been developed by Joe L. Schmitt, Jr., originator of the Exacto-matic System. This double-entry method of bookkeeping by machine uses punched-card accounting equipment supplied by Remington Rand, Inc. and is said to cut accounting costs in half and reduce time to one-fifth that required by manual methods.

The system reduces the businessman's accounting to simple daily entries recorded on a special form supplied by Mr. Schmitt's centralized bureau. These data are converted to double-entry bookkeeping on the punched-card system. The monthly accounting can be completed and returned to the businessman within 5 to 10 days of the time he closes his books for the month.

The secret of Mr. Schmitt's system is the use of a single punched card to develop details of each business transaction recorded on the daily journal. With his patented system of coding, Schmitt can use one punched card for eight different recordings of the information. High-speed machines leased from Remington Rand sort these cards at the rate of 420 a minute and prepare the reports at the rate of 100 lines a minute.

In comparative tests against manual double-entry bookkeeping, using the same data, the Exacto-matic System was able to accomplish in 1¼ hours work that required 7 hours by manual methods, Mr. Schmitt reports. Adding a margin for emergency interruptions, he estimates that his system will save 80 per cent of the time usually required for bookkeeping, and cut costs by at least 50 per cent.

Cities of 10,000 or more, Mr. Schmitt believes, will support the operation of at least one central bureau to handle small-business bookkeeping. He plans to establish one of his central bureaus in every state, and now has franchises in operation, or ready to go into operation when the Remington Rand equipment is installed, in 16 states. He hopes ultimately to set up the system in 380 cities.

Further information may be secured from Remington Rand, Inc., 315 Fourth Ave., New York 10, N. Y. Or use the Request Card on page 16. Circle No. 32.

Masonry Anchoring Devices And Wire-Rope Accessories

A 20-page catalog on a complete line of masonry anchoring devices and allied products has been prepared by U. S. Expansion Bolt Co., York, Pa. The line includes lag-screw expansion shields, machine-bolt expansion shields, machine-screw anchors, wood-screw anchors, nail anchors, wire-rope clips, wire-rope thimbles, toggle bolts, turnbuckles, bent-wire eye bolts, one-hole pipe clamps, carbide-tipped drills, star drills, and cold chisels. The catalog gives a full description and an illustration of each item, along with dimensions, specifications, and prices.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 21.

Dietz Moves to Syracuse

On September 1, R. E. Dietz Co., maker of lanterns and lighting equipment for motor vehicles, will move its main office and warehouse from 60 Laight St., New York City, to 225 Wilkinson St., Syracuse, N. Y., where its manufacturing plant is. This move affects all departments of the company, including domestic and export sales, warehousing and accounting, and correspondence.

One of several new hydraulic jacks made by American Hydraulics, Inc.—the Standard Model No. S2011. The pump unit is at an angle; this makes it possible to center the lifting ram so that loads are carried in the exact center of the base.

New Hydraulic Jacks

A wide variety of new hydraulic jacks with capacities ranging from 1½ to 30 tons have been engineered by American Hydraulics, Inc., 203 N. Wabash Ave., Chicago, Ill. There are 8 different models in the Giant-Lift line and 7 in the Standard line. The Giant-Lift jacks have a removable pump unit which enables cleaning the valve seats, replacing packing, etc. The pump unit is at an angle which permits centering the lifting ram so that the loads are carried in the exact center of the base. The lighter models are for vehicle lifting. The larger models are for heavy lifting and structural use.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 60.

Catalog on Roadside Mowers

A 4-page catalog illustrates the standard line of rotary disk mowers made by Worthington Mower Co., Stroudsburg, Pa. These mowers, available in five models, can do roadside mowing in and around brush and along guardrails. The largest model has a 62-inch cutting width and is powered by a 6-hp gasoline engine. The catalog points out that all units cut within 2 inches of any obstacle and will cut growths 1 inch to 4 feet tall. All models are illustrated and complete specifications and construction features are included in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 25.

New Trenching Hoe

A new trench-type hoe has been developed for the Allis-Chalmers HD-5G Tracto-Shovel to increase its applications in the excavating field. The hoe, manufactured by the Tractomotive Corp., Deerfield, Ill., has a bucket capacity of ½ cubic yard. The company suggests its application for digging water, sewerage, and gas lines; digging trenches for foundation footings; and excavating for gasoline and fuel storage tanks, etc.

The Tractomotive hoe has full hydraulic control and mounts on the booms of the HD-5G in place of the bucket. The standard bucket is designed to dig flat-bottom trenches, though special buckets are also available. A special pulldozer can be used in place of the bucket to clean irrigation and drainage ditches. The unit has an overall reach and dumping clearance of 11 feet. It may be used to dig a 27-inch trench to a depth of 8 feet. Conversion from the Tracto-Shovel to the trench hoe requires about 30 minutes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 132.

Tractomotive's new trench hoe was developed for the Allis-Chalmers HD-5G Tracto-Shovel. It has a bucket capacity of ½ cubic yard.

This is it!
THE AIR METER
you have been waiting for!

Improved Pressure Method for Testing Air Entrained Concrete

FEATURES OF THE
PRESS-UR-METER

- Precision built—accurate—fast.
- Tests aggregate moisture & sp. gravities.
- Not affected by changes in barometric pressure.
- Exactly .250 Cu. Ft. capacity.
- Light in weight.
- Compact—built-in pump and instant release valve, automatically closed when not in use.
- Quick and easily adjustable clamps.
- Simple method provided for testing accuracy of the Meter.
- Reasonably priced by standardized production methods.
- Approved and in use by government agencies.

For complete information write to
Exclusive Sales Agents
CHARLES R. WATTS & CO.
4121 - 6th Ave. N.W. Seattle 7, Wash.

Bethlehem Safety-Beam Guard Rail at bridge approach on Route 37, between Martinsville and Bloomington, Indiana. Contractors: William D. Vogel, Indianapolis, and Rieth Riley Construction Co., Goshen, Ind.; Guard Rail Erector: James H. Drew Corp., Indianapolis.

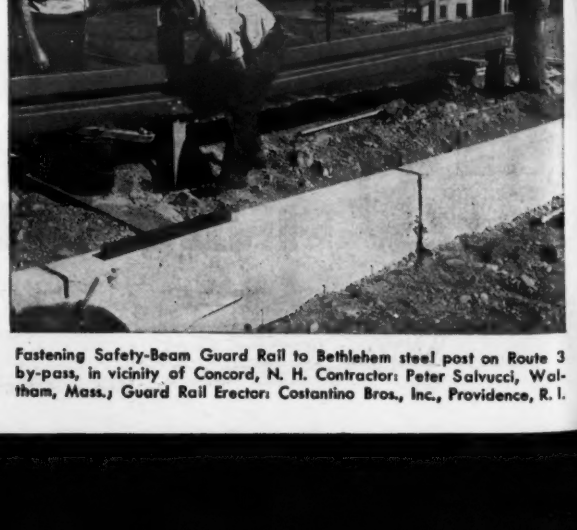
For Extra Protection Use Safety-Beam

To provide extra protection for motorists, use Bethlehem Safety-Beam Guard Rail at sharp turns, embankments, bridge approaches and other dangerous locations along highways.

Bethlehem Safety-Beam Guard Rail provides maximum safety at highway danger points for two reasons: (1) strength, and (2) ability to absorb impact. Safety-Beam consists of heavy sections of steel plates, bolted together on steel posts to form a continuous, impact-absorbing beam. When a vehicle strikes Safety-Beam, impact is absorbed by several posts, making it virtually impossible to crash through the rail.

Safety-Beam is easily visible at all hours. It can be installed quickly, too, even by unskilled labor, for it fastens to steel or wood posts with but one bolt. No end anchor rods, special tools or complicated adjustments are required. Safety-Beam regularly comes in easy-to-handle 12 ft, 6 in. lengths, but is also furnished in longer lengths.

Our Folder 545 gives standard details and assembly plans for Safety-Beam Guard Rail. For your copy, contact the nearest Bethlehem sales office. Or get in touch with us at Bethlehem, Pa.



Fastening Safety-Beam Guard Rail to Bethlehem steel post on Route 3 by-pass, in vicinity of Concord, N. H. Contractor: Peter Salvucci, Waltham, Mass.; Guard Rail Erector: Costantino Bros., Inc., Providence, R. I.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

STEEL FOR HIGHWAYS

Dowel Units • Reinforcing Bars • Bar Mats
Guard Rail • Guard Rail Posts • Wire Rope and Strand
Hollow Drill Steel • Spikes • Bolts and Nuts
Pipe • Timber Bridge Hardware • Tie-Rods
Sheet- and H-Piling • Fabricated Structural Steel

BETHLEHEM STEEL

Local "Agg" Is Used, Hot-Mix Costs Drop

Portable Asphalt Plant Is the Other Key to Economy in 30½-Mile Road Betterment Program In Maine

✦ LAST season the Maine State Highway Commission, under a maintenance betterment program, surfaced 30½ miles of highway with asphaltic concrete at the low rate of about $7 a ton for the hot-mix. Two factors were responsible for this economical figure—(1) the use of local aggregate, which saved heavy transportation charges, and (2) the use of portable asphalt plants which were quickly set up and easily moved to other locations when the job was finished. The Maine plant-mix program was done under contract, after the state maintenance forces had handled the preliminary phases of the betterment such as patching and cleaning the old pavement under improvement. Shoulder work was also done by the maintenance forces following the paving.

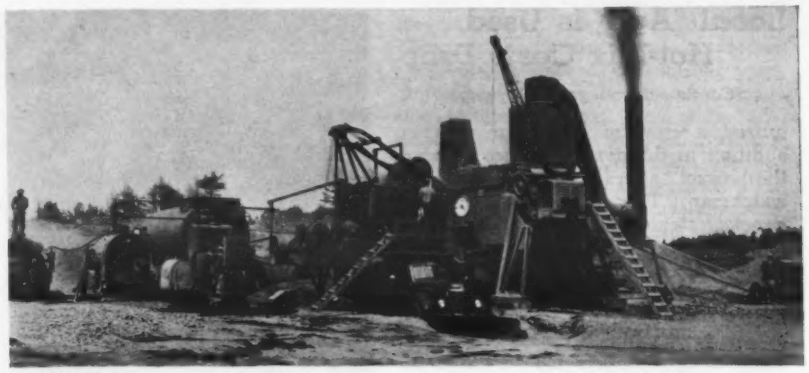
When Maine first got into asphaltic-concrete surfacing a few years ago, the procedure was to employ crushed stone for the aggregate, even though at times it meant shipping the material some distance to the job from the source of supply. During the last two seasons this practice was discontinued, and material obtained close to the job site was used for aggregate. This move lowered the price of the hot-mix from $10 and up a ton to the $7 scale that was the average for the work last year.

Typical Project

A typical project in the betterment surfacing program was a 3-mile section of U. S. 1 along the coast from Warren east to Thomaston. Here a concrete pavement, 20 feet wide, was constructed in the early 30's. Its surface had become cracked and rough-riding, and had been given a bituminous surface treatment which gave only temporary relief. Accordingly the Maine State Highway Commission awarded a contract for the improvement of this stretch to Warren Bros. Roads Co. of Fairfield, Maine. The work included laying two 1-inch courses of hot-mix, the bottom layer as a leveling course and the top as a surface course. The low bid of $30,095 covered the mixing and placing of 4,200 tons of asphaltic concrete, at a unit price slightly in excess of $7 a ton.

Aggregate for the mix was obtained from a gravel pit only 4 miles from the eastern end of the job. A Pioneer 46VE diesel-electric crushing plant was set up at the pit, and in 7 days had produced enough material for the job. The gravel had been crushed and screened so that the finished product passed the ¾-inch screen. From the crusher the gravel was moved over the ground by a Caterpillar D6 dozer to a stockpile where a Warren Bros. 400 Series mobile asphalt plant had been set up. Only a few days had been required to erect the asphalt plant and get it in operation. Hot-mix was turned out two days after the gravel processing got under way.

The laying of the black-top was finished off in about 7 days, with the work proceeding at the rate of around a mile a day for each course. Actually the base or levelling course took more time, as was to be expected, than the top course, but the plant averaged around 575 tons of material in a 10-hour day. Two Adnun Black Top Pavers laid the mix in 10-foot lanes, one machine doing half the width of the paving course in the morning, while the other paver did the abutting half in the afternoon. In this way the pavers were always going ahead, and never had to be moved back.



C. & E. M. Photo
This Warren Bros. 400 Series mobile asphalt plant, assembled from four trailer-mounted units, served a typical Maine betterment surfacing project on U. S. 1 from Warren east to Thomaston. A Cleaver-Brooks boiler is at the far left.

Portable Plant

The Warren Bros. mobile asphalt plant was assembled from four portable units, each of which was mounted on a trailer for easy moving. It was operated by four diesel engines, and re-

(*Continued on next page*)

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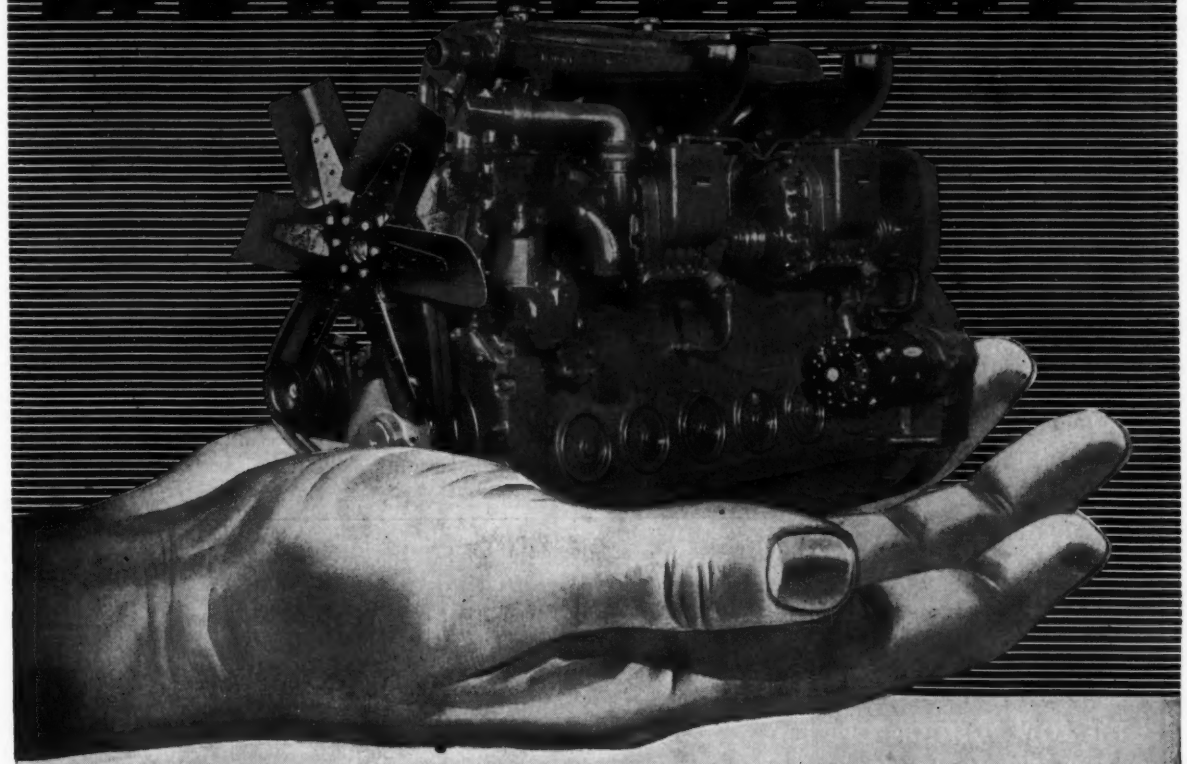

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P&H DIESEL DIVISION
HARNISCHFEGER CORPORATION
PORT WASHINGTON WISCONSIN, U. S. A.

Local "Agg" Is Used, Hot-Mix Costs Drop

(*Continued from preceding page*)

quired a crew of only four men in addition to the dozer operator moving the gravel, a crane operator, and a watchman. The boiler, a Cleaver-Brooks steam generator, was also readily moved about on a trailer. The 8,000-gallon asphalt storage tank was likewise built as a portable unit.

Esso asphalt, having an 85-100 penetration, was supplied by the Trimount Bituminous Products Co. of Everett, Mass., and delivered to the job plant after a 170-mile over-the-road haul in transport trucks. The big tank trailers carried about 3,000 gallons, and usually moved by night, leaving Everett at 9 p. m. and arriving at the Maine highway project by 7 o'clock the next morning. The asphalt was then transferred to the storage tank by the plant pump. Fuel oil was purchased in near-by Rockland and delivered to the 2,500-gallon storage tank at the plant after only a 5-mile haul. Water for the boiler and general plant use was taken from city hydrants in Thomaston and transported in a 1,000-gallon tank truck.

C. & E. M. Photo

An International truck discharges hot-mix into an Adnun Black Top Paver on a 3-mile maintenance project, done by contract, in Maine.

Plant Operations

In the plant operations, a Northwest crane with a 45-foot boom and a Blaw-Knox 1-yard clamshell bucket picked up the aggregate from the stockpile and fed it into a materials-receiving hopper. A bottom feeder moved the material along to a 20-foot cold elevator that emptied into a No. 199 Pacific-type drier 5 feet 6 inches in diameter x 24 feet long. Heat was supplied from the opposite end by a Hauck burner fueled on a steam and oil mixture. A fan at the intake end of the drier drew off the fines into a dust collector, while the smoke and fumes went up through a smokestack. From the bottom of the dust collector the fine, settled material was moved by a worm gear to the bottom of a 25-foot hot elevator.

The heated aggregate was also discharged from the low end of the drier onto the hot elevator which lifted the material up to the gradation unit. This consisted of four decks of Symons screens — a 4 x 4-foot screen with ¾-inch mesh; two 4 x 6-foot screens with ⅜ and ¼-inch mesh respectively; and a 4 x 4-foot screen with ⅛-inch mesh. The four different sizes of aggregate thus obtained dropped into four bins with hydraulically controlled hoppers that discharged the material into a skip bucket. From the gradation unit the skip containing the aggregate was raised 12 feet up to the mixer.

Both aggregate and asphalt entered the pugmill together, after being weighed on two Howe dial scales. The asphalt entered its weighing tank from a 4-inch jacketed line through which ran a 1-inch steam line to supply the needed heat. The mixer had a 3,500-pound capacity, but the batch used on this particular job weighed 3,400 pounds. Asphalt and aggregate were mixed together for 1¼ minutes, after which the material was discharged through a hydraulically-controlled gate into trucks backed under the mixing unit of the plant.

Diesel-Driven

Four diesel engines supplied all the power for the plant operations. A Caterpillar D8800 unit ran the drier through a belt drive. A General Motors 4-cylinder diesel engine operated the mixing unit by a belt drive, and also ran a generator to supply power for a motor that raised the skip bucket to the mixer. The gradation unit was actuated by a GM 3-cylinder engine via a chain drive. A Caterpillar diesel generator furnished power to electric motors required for other plant functions such as the aggregate feeder, fan for the dust collectors, worm gear, oil and asphalt pumps, and boiler operation.

Typical batch weights were:

Sand	1,400 lbs.
¼-inch gravel	750 lbs.
⅜-inch gravel	200 lbs.
¾-inch gravel	850 lbs.
Asphalt	200 lbs.
Total	3,400 lbs.

The composition of the mixture conformed to the following proportions:

Sieve Size	Per Cent Passing
¾-inch	100
½-inch	70-88
No. 4	46-60
No. 8	32-47
No. 40	10-26
No. 80	4-18
No. 200	0-8
Bitumen (per cent of mineral aggregate)	5-7

The mix was heated up to 325 degrees F so that it was put on the road at a temperature of around 275 degrees F. The same mix was used for both bottom and top courses.

On the Road

From the plant the hot-mix was hauled to the highway in 7 trucks—2 contractor-owned Internationals carrying 8 tons, and 5 assorted trucks, hired by the hour, holding 6 tons. As the loaded trucks left the plants they were weighed on Winslow beam scales. The material was covered with tarpaulins to retain the heat.

As the hot-mix was laid by the

(*Concluded on next page*)

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PROVIDES AMERICA'S MOST MODERN, LOW COST EQUIPMENT TO PROCESS AND DELIVER SUPERIOR QUALITY CONCRETE.

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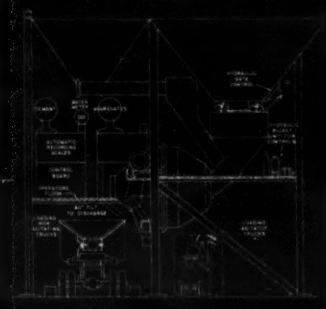
CENTRAL MIXING PLANTS ARE EASILY AND QUICKLY ERECTED. THE LOW COST WILL AMAZE YOU.



THE LOW POSITION OF THE TILTING MIXER GIVES VERY LOW OVERALL PLANT HEIGHT, FAST PROCESSING OF CONTROLLED SLUMP CONCRETE—PRE-SHRINKING AND EFFICIENT CENTRAL MIXING—

BEFORE INVESTING— INVESTIGATE

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AN AFFILIATE of GENE OLSEN CORP. (GOCORP)

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BIGGER PAYLOADS
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• Exclusive features in design and construction make payloads bigger... at lower cost! Weight is balanced, not cumbersome. Extra strength is built into every part with the sturdy welded rolled steel construction pioneered by Wellman, the leader for over fifty years. A type for every service!
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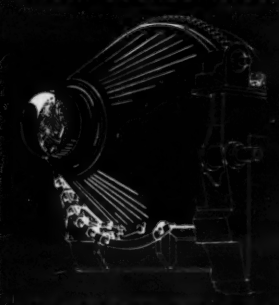
FEATURES A TILTING MIXER WHICH IS FURNISHED COMPLETE WITH SUPPORTING FRAME STRUCTURE. A UNIQUE TILTING FEATURE PERMITS THE LOWER MOUNTING OF THE MIXER—AN IMPROVED BLADE ARRANGEMENT SPEEDS THOROUGH MIXING ACTION. THIS COMBINATION GIVES COMPLETE DISCHARGE OF CONCRETE THAT IS FREE FROM SEGREGATION



THE PLASTOGRAPH, AN EXCLUSIVE SUPREMIX DEVICE, CONSTANTLY SHOWS THE CONSISTENCY OR SLUMP OF THE CONCRETE *DURING* THE MIXING CYCLE. THIS CONTROL ALLOWS THE OPERATOR TO ADJUST THE MIX AND TO DISCHARGE SPECIFIED CONCRETE FOR EVERY LOAD

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Adnun Black Top Paver, it was compacted first by a Buffalo-Springfield 10-ton tandem roller, and then by a second B-S roller, a 14-ton 3-axle tandem machine. Traffic was heavy along U. S. 1 when this job was done last July, and 4 flagmen maintained one-way traffic over the lane not under construction. The rest of the road crew was made up of a foreman, paver operator, 2 roller operators, 2 rakers, and 2 shovelers.

Personnel

Warren Bros. Roads Co. was represented on the contract by Clarence C. Bradford, Superintendent; Ken Cleaves, Materials Engineer; and Dwight York, Plant Superintendent.

Field inspection for the Maine State Highway Commission was handled by Stewart Associates, Inc., a consulting engineering firm of Cambridge, Mass.

John B. Church is Superintendent of Maintenance for the Maine State Highway Commission, and his assistant Chester Worthylake is in charge of the betterment surfacing program. Lucius D. Barrows is Chief Engineer of the Commission.

BPR and Conn. Cooperate In State Maintenance Study

A year-long study of maintenance has begun in District 1 of Connecticut, carried on by members of the State Highway Department and representatives of the Bureau of Public Roads. The Bureau has undertaken other such studies in county highway organizations, but this is the first time it has focused on a state highway department's maintenance. Highway, roadside, and structure work will be surveyed, as well as winter work with snow and ice, in the hope of determining more efficient use of trucks, graders, oilers, etc. Ultimate object, of course, is to devise ways of working which may arrest the rising costs of maintenance.

The studies will take into account such important matters as storing sand for snow and ice control and methods of loading this sand. Comparisons will be made to determine which is more efficient, fewer sand piles with automatic loaders or more piles with hand loading. Effort will be made to coordinate any differing methods that may exist between areas. The researchers hope to establish information which will permit better overall control and distribution of equipment.

John Olshesky and two other members of the Department will work with Fred J. Verity and, later, Roy E. Pomeroy of the BPR on the project.

All-Welded Roof Trusses

A 12-page booklet about Macomber all-welded roof trusses for spanning large unobstructed areas has been prepared by Macomber, Inc., Canton, Ohio. It describes the adaptability of Macomber trusses for areas of any length and spans of 30 to 180 feet. Safe-loading tables, bracing information, and illustrations in the booklet help the designer to fit these completely standardized units to individual structural needs.

The catalog illustrates the entire roof structure and points out that Macomber produces the trusses and purlins and supplies the steel decking complete. It illustrates these units assembled in a typical roof system, and points out that wood sheathing or corrugated-steel decks can also be used. Six different one-story profiles permit application to almost any type of commercial or industrial structure. The variety of profiles is based on a bowstring truss—with or without lean-to, separating fire walls, standard monitor frame, and interior columns for crane runways to provide operational versatility.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 9.

Resistance of Concrete To Various Influences

A reference text treating the influences of various chemical and physical reactives on concrete has recently been offered to American engineers. The new 281-page book discusses the inherent resistance of concrete—or lack of it—to almost every conceivable reactive element from acetic acid to zinc sulphate. More than this, it expounds the basic rules for avoiding damage to concrete and reinforced-concrete structures and surfaces.

The original work, "Influences on Concrete" by A. Kleinlogel, has been translated from the German by F. S. Morgenroth, C. E. A book with lifetime value, it has wisely been set up in dictionary form. That is, the various influences on concrete are listed alphabetically so that one can refer with ease to a particular problem. Properties of concrete, special-type concretes, and admixtures for improving the resistance of concrete to destructive elements are included in the same fashion.

The subjects treated are representative, in that all important and recurrent influences are presented. Many less frequently encountered influences are discussed too, thus making the book a valuable reference for both the usual and the unusual occurrence.

For example, chemical influences listed include sewage, salt, oils, tannin, colorings, rust, locomotive gases, sulphides, potash, swamps, etc. Listings of physical influences include temperature, vibration, fire, frost, lixiviation, X-rays, stone borers, electricity, resonance, etc. Some of the special concretes discussed are listed under wood, solidite, pumice, gas, etc., while admixtures such as Tricosal, calcium chloride, Plastiment, and Sika are included. The author has separate listings for the physical and chemical properties of concrete, and discusses plastic flow, storage, permeability, shrinkage, swelling, weather resistance, etc. Following the discussion of each influence, the author often cites one or more actual job experiences with the destructive effects of a particular material or force.

The work may be obtained from the Frederick Ungar Publishing Co., 105 E. 24th St., New York, N. Y. Price: $7.50.

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gives you this exclusive combination of advantages . . .

1 8 Overlapping Forward Speeds . . . Flexible working range speeds work—increases output—provides high transport speeds.

2 Wide Range of Blade Positions—Without Mechanical Adjustments . . . Saves Time in Adapting Machine to Needed Cuts.

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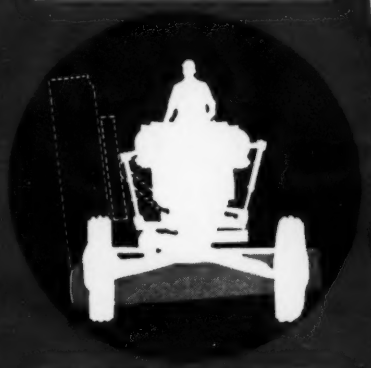
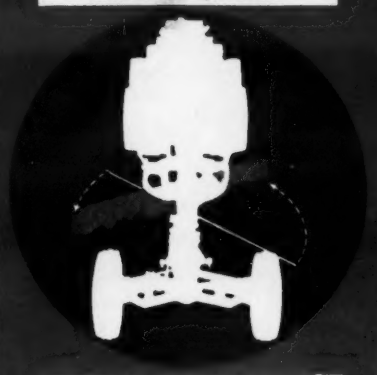
Positive, Accurate Blade Adjustment



Free Blade Movement Without Mechanical Adjustments



Blade Angle can be Changed with Blade Loaded

The Adams mechanical control system offers a number of outstanding advantages that contribute importantly to fast, smooth, low-cost grading operations:

• Revolving gears always move positively and at uniform speed—insure positive, accurate blade adjustments of any kind, at all times.

• Extent of blade movement is not restricted as with hydraulic rams—blade moves freely from beneath grader to bank cuts, without mechanical adjustments.

• Controls are backed by full h.p. of grader engine, making it possible to change angle of blade and direction of material delivery with blade loaded. This is highly important on grade balancing work.

• Geared mechanical steering provides same natural feel and control of motor vehicles—steering is always safe, sure, easy.

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Make your next motor grader an ADAMS

Field Phone Booth Cuts Out the Noise

Communication between workers and from the field office to the job, particularly where large buildings are under construction, is necessarily difficult because of noise. A new type of telephone booth has been manufactured by the Burgess-Manning Co., Libertyville, Ill., to save time and prevent costly misunderstanding in phone conversations.

The Acousti-Booth is soundproofed to permit conversation without raising the voice, even in the noisiest spots, the manufacturer says. It is perforated inside and out and lined with sound-absorbing acoustical material which is said to soak up noise and create a hushed area that not only prevents outside noise from reaching the telephone user but absorbs the noise before it filters into the phone mouthpiece and thence back to the ear of the speaker.

Acousti-Booths are made in two models, both doorless. One is a full-length affair, resembling the conventional telephone booth, but more comfortable and sanitary, the manufacturer says. The other is the Scout, a waist-high model that may be hung on the wall or placed on a desk. This model is adaptable to noisy spots where space is at a premium. Both models have shelves for writing.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 124.

New Line of Barrows With High-Lift Legs

Contractors' barrows with an exclusion high-lift feature have been introduced by General Wheelbarrow Co., Inc., 700 E. Tenth, Wichita 1, Kans. The barrows' new Hi-Lift legs are designed to save stooping and unnecessary strain on the workmen by reducing the lift height. This design places the barrow handles within easy reach of the average workman.

The General barrows are available with struck capacities of 3, 3½, and 4 cubic feet. Better balance is said to be achieved by a 7½-inch spread at the wheel hub. Handles are wood or tubular steel.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 111.

New Hydraulic Pumps

Three new hand-operated hydraulic pumps have been developed by the Blackhawk Mfg. Co., Milwaukee 1, Wis., for the replacement of mechanical controls. These single-acting pumps are available in three capacities for systems requiring from 2,500 to 6,000-psi pressure. The new, smaller Power-Packer, Jr., is rectangular-shaped, 6½ inches high, 3½ inches wide, and 7⅞ inches long. The length of the handle is 17¾ inches. The unit consists of a pump, reservoir, and control valve.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 128.

New Flashing Light

A new portable flashing light for use on highways, streets, or hazardous places has been developed by Hi-Way Specialties Co., 720 W. 79th St., Chicago 20, Ill. The Blink-Lite features quick set-up, leakproof wet batteries, a self-contained charger, and a motor-driven flasher.

The unit has a minimum height of 4 feet and an extended height of 9 feet. The tripod legs may be locked in open or closed positions. Battery box and light are separate. The weatherproof battery box is constructed of sheet steel and has three nonbreakable windows to permit easy checking of battery power. Each battery has a built-in specific-gravity indicator. The battery may be recharged by removing the cover and plugging in a 3 to 5-amp 110-volt self-contained charger. The company says that this can be done approximately 275 times before the batteries lose 40 per cent efficiency. The Blink-Lite will give 80 to 100 hours of continuous flashing before the batteries have to be recharged, the company says. The unit is equipped with a 4-tooth cam to provide 40 to 45 flashes per minute.

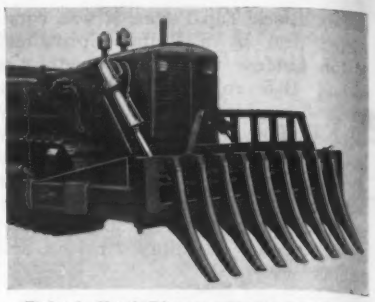
The Blink-Lite will give 80 to 100 hours of continuous flashing before its batteries have to be recharged. It has a minimum height of 4 feet and an extended height of 9 feet.

The Blink-Lite has a 7-inch-diameter lens with prism finish. It is available in red, amber, green, pink, and blue. The words *Stop, Slow, Caution,* or *Police* may be set in the lens. The light is weatherproof and hooded to provide visibility of one mile or more.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 43.

Land-Clearing Tool

A new land-clearing tool, companion to the Baker line of bulldozers and Gradebuilders, has been announced by the Baker Mfg. Co., Springfield, Ill. The Root Ripper, as it is called, may be purchased as an interchangeable attachment for cable and hydraulic dozers, or as a complete machine. The attachment consists of nine teeth securely bolted to horizontal cross members and rigidly tied together by brackets for quick attachment to the dozer frame. The teeth are one-piece steel castings, curved to give a rolling action so that dirt is shaken loose and filtered between the teeth. The new tool may be used for removing and piling brush, roots, rocks, boulders, etc.



Baker's Root Ripper may be purchased as an interchangeable attachment for cable and hydraulic dozers, or as a complete machine.

Further information may be secured from the company by requesting Bulletin 887. Or use the Request Card at page 16. Circle No. 34.

SLING YOUR LOAD ON A GMC—*and watch it roll!*

These Middleweight Movers Can Take Most Anything

RIG the short wheelbase with dump body, cement mixer, or fifth wheel for trailer work—or take a longer job with stake or flat body for moving what comes. Mister, you'll *never* find the like of these GMC 450-470 Series for getting your hauling done!

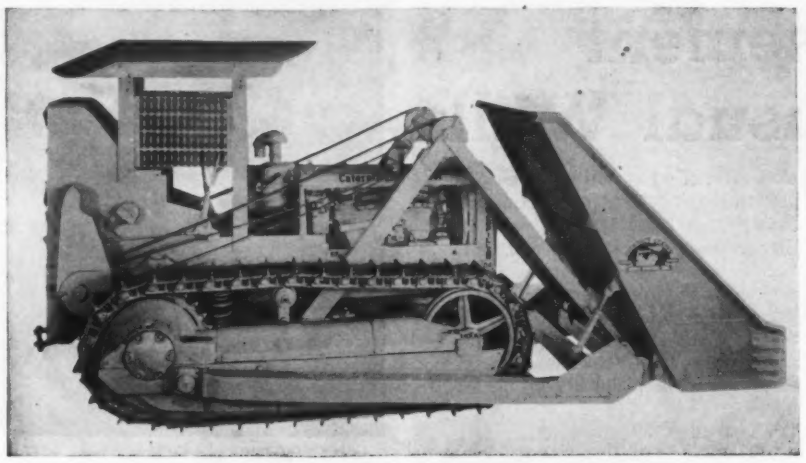
These babies are burly all the way through. Just check on the gear ratios you can get—five-speed direct or over-drive transmissions plus a choice of hypoid, two-speed or double-reduction rear axles. That's why the same truck you see slogging a full load up a tough climb can beat up such a breeze on the highway.

Or put this truck on the hoist and see how it's built underneath—heavy duty in every

New Overshot Loader With 1-Yard Capacity

A recent addition to a line of overshot loaders for tractor mounting is the Austin Model 4-C made by John Austin, Inc., 703 First National Bank Bldg., Denver, Colo. The loader is readily attached to utility-size tractors, including the Caterpillar D4, Allis-Chalmers HD-5, and International TD-9.

The loader has a rated capacity of one cubic yard and a 20-second loading cycle. It is designed to handle bank-run material at a rate of 125 yards per hour on a 50-minute hour, with no increase in fuel consumption over normal dozing operations. The overshot action, which eliminates swinging and blocking, is powered by a Caterpillar Model 24 cable control unit driving a single cable through a wrap-around series of sheaves. The result is even tension at both sides, maximum power at the start of the loading cycle, and maximum speed for the balance of the cycle, Austin says.



John Austin, Inc., makes this overshot loader for tractor mounting. It has a rated capacity of one cubic yard and a 20-second loading cycle.

The Model 4-C is made in two heights, one for surface operation and one for underground work. The standard machine for surface operation has an overall height of 15 feet 3 inches with bucket raised, and a dumping clearance of 8 feet. For underground work it has an overall height of 12 feet, bucket raised, and a dumping clearance of 6 feet. Both units are designed for adequate clearance for highway transportation.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 59.

New Six-Foot Mixer For Plaster, Mortar

A new 6-cubic-foot plaster and mortar mixer is made by the Ransome Construction Equipment Division of Worthington Pump & Machinery Corp., Dunellen, N. J. Its simple operation and safety features make a special operator unnecessary where the crew is small, the company states. The machine is said to handle enough material to keep 30 men working on larger jobs.

To speed up charging operations, Worthington has equipped the protective grill over the mixer with a bag cutter. The operator can break the bag over the cutter and lift up the ends to empty material into the mixing bowl. The bag platform is built on a 20-degree angle so that contents can enter the bowl without spilling.

Six adjustable steel blades and four stationary blades are designed to give fast, thorough mixing action. Wide blades, set close to the drum shell, clean the drum. An effective lock prevents the bowl from dumping while in operation.

Further information may be secured from the company by requesting Bulletin R50-11. Or use the Request Card at page 16. Circle No. 68.

Laboratory for Safety Equipment Is Dedicated

"That men may work in safety"—the John T. Ryan Memorial Laboratory was dedicated on June 14 by Mine Safety Appliances Co., of Pittsburgh, in memory of its co-founder, who died in 1941. Though it was their experience in mine fires and explosions that led John Ryan and George H. Deike to found a company which would supply apparatus, equipment, and instruments to protect workers, the company's activities have expanded since 1914 from mining into all branches of industry.

The 400 executives and leaders in safety and industrial health who attended the ceremonies also had a chance to inspect the 4-story laboratory building and witness demonstrations of research and testing procedures. A display in the rubber and plastics laboratory covered the development of protective hats and caps of laminated plastics. Dust-lab exhibits showed respirators and dust-sampling equipment. Instruments that administer oxygen were on view in the physiology lab. Various devices for detecting poisonous or flammable gases were on show, including a carbon-monoxide recorder used for ventilation control systems in vehicular tunnels. MSA's entire line of safety equipment was assembled, with products ranging from first-aid kits to a mobile laboratory for air-pollution surveys.

Dr. William P. Yant directs the company's research and development program.

Automatic-Clutch Folders

The complete line of Mercury automatic clutches is described and illustrated in three new bulletins released by Automatic Steel Products, Inc., of Canton 6, Ohio. Bulletin 216, 8 pages, describes the Mercury clutch in general, listing and illustrating various applications. Bulletin 217, 4 pages, deals with Mercury automatic clutches applied to gasoline engines. Bulletin 218, 4 pages, covers electric-motor installations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 77 and indicate which bulletin interests you.

detail. Don't miss those alligator cross-members that put rigid strength in the frame with less dead weight. GMC's don't need fishplating to support a body. Note that the spring hangers lap around and *under* the frame—loads don't ride the rivets in GMC's. There's added safety, also, in having the *two* top leaves in the front spring wrap around the shackle bolt.

GMC
GASOLINE & DIESEL TRUCKS
GM
GENERAL MOTORS
FROM ½ TO 20 TONS
Your key to greater hauling profits

Get Behind The Wheel For The Real Story

Drivers would rather wheel a GMC than anything else on the road. No other truck can steer as easy as these jobs with the GMC recirculating ball-bearing gear—and the wide-tread front end boosts road stability. The 120-HP valve-in-head "workhorse" engine, constant-mesh transmission, and cushion-disc clutch—these make a power team that any guy is glad to have on his side. And the GMC lifetime "six-footer" cab has room to spare for the biggest Joe in the outfit.

GMC Series 450-470 comes in wheelbase from 122 to 197 inches, and ranges from 19,000 lbs. GVW to 37,000 lbs. GCW. Let your GMC truck dealer show you full details and full specifications on the truck that's best for your own job. Then, when you read the price tag—you'll see why these GMC's are *far and ahead the best buy in the middle-duty class.*

GMC Truck & Coach Division of General Motors

Building Basement Has Unusual Walls

Basement Walls Are Built Against Surcharged Ground By Drilling Cast-in-Place Piles and Using Bracing

(*Photo on page* 1)

✦ A DEEP basement wall along three sides of the newest department store in Houston, Texas, has just been built successfully, despite a heavy surcharged condition in the adjacent streets. By drilling cast-in-place piles on 42-inch centers and bracing with heavy 12 x 12-inch timbers against concrete kicker blocks, the remainder of excavation was done and the basement wall built according to plan.

The job is Tellepsen Construction Co.'s part of what will be a new $8,000,000 Sakowitz Bros. department-store building at Main, Dallas, and Fannin Streets near the city center of Houston. Foundation problems got the job off to a slow start, but after they had been solved, the schedule picked up so fast that Houstonians could scarcely believe their eyes as they watched the structural-steel frame mushroom up toward the sky.

Measuring 252½ x 153½ feet, the new Sakowitz Bros. establishment will have 5 stories and 2 penthouses, with provisions for future expansion if the need arises. It is to be a modern piece of architecture in keeping with the fine buildings on Houston's skyline. It has an all-welded main structural framework, although a few of the cross members are bolted. The outside of the building is to be finished in marble with glass show windows.

It was designed by Alfred C. Finn, Architect, and Robert J. Cummins, Consulting Engineer.

The Wall Problem

The north side of the building lies adjacent to the First Baptist Church, and special work was required there to protect the existing foundations. At the other three lines, however, the building lies along the edge of the street. The problem here was how to build the basement wall in such a way that it would not move under the heavy surcharge of earth, loaded trucks, structural steel, and other building materials.

One design called for steel sheet piles along the wall, but it was abandoned. The final design consisted of cast-in-place concrete piles at 42-inch centers, braced by 12 x 12's, which became an integral part of the reinforced-concrete basement wall when poured.

This wall, which will outline the basement of the building, goes 4 feet below the basement floor line. The basement floor keys into the wall, and a reinforced-concrete sidewalk ties its top in monolithically with structural members in the building.

Foundation Excavation

Approximately 30,000 cubic yards had to be excavated. The material consisted of gumbo; grayish-yellow joint clay; yellow, red, and white clay; a thin layer of water-bearing sand; white clay and sand; and finally the hard red Beaumont clay on which most of Houston's heavy buildings rest. This work was sublet to Sausley Excavating Co., and got off to a good start October 26.

Two and sometimes three Northwest ¾-yard draglines worked to muck out the center material. Some of the muck was sold, some was hauled away free by people who needed the dirt, and some had to be disposed of in waste areas. A Houston traffic policeman was stationed near the site to help the contractors speed their truckloads of dirt on the way.

The last dragline which worked on the foundation stayed down in the bottom. After it had finished, it left on a timber ramp at the southwest end.

Cast-in-Place Piles Drilled

A subcontract to Sure Bottom Foundation Drilling Co. called for the drilling of cast-in-place piles. Working from street level, a drill rig with a rotary bit first bored a round hole 18 inches in diameter. The hole was carried down about 24 feet below the street level, except for 14 piles along Fannin Street which were 28 feet below street level.

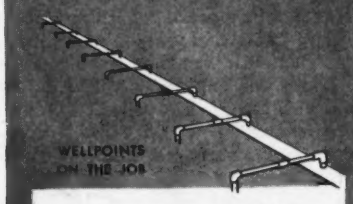
After the hole had been drilled, the machine picked up a special reaming bit with cutting wings. This tool then reamed the hole to a semi-elliptical shape. The reinforcing steel core was then set in, and truck-mixers came in with concrete. Each pile was poured

(*Continued on next page*)

C. & E. M. Photo

Looking south along the Sakowitz building foundation, this view shows the general arrangement of concrete cast-in-place piles and the 12 x 12-inch timber bracing which supports them. Tellepsen Construction Co. was the contractor.

dewater the Complete way



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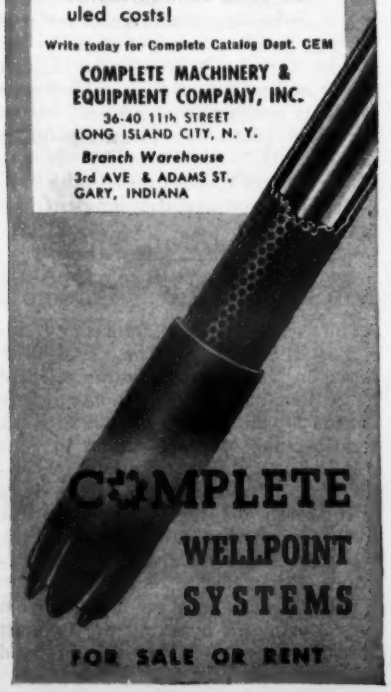

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the same day the hole was dug, and in general the machine accounted for an average of 8 piles per shift.

On every third pile, a special wood template was fastened to the reinforcing-steel mat to hold two large steel bolts. It was spaced so the bolts would stick out of the concrete 6 feet below the top of the pile. These bolts were to be used later when the heavy bracing was constructed.

There were 164 of these piles in all. Drilling began on October 14. It was one of the first items of the job. A two-week strike shut all phases of the project down for a time, but the cast-in-place work proceeded so rapidly afterward that the last pile was in on December 5.

Heavy angle irons were then fastened to the steel bolts, and the earth was sloped to accommodate the large braces which the architects had specified. On every third pile, a 12 x 12-inch timber brace was fastened to the I-beam and carried on a downward slope to a point below the basement floor-slab line. Workmen then dug out a hole, shaped to increase the bearing area as much as possible, and truck-mixed concrete came in to make the kicker blocks for the timber braces.

After the bracing was in and the concrete blocks had hardened sufficiently to take the load, a Traxcavator front-end loader on a Caterpillar tractor worked in and excavated the remaining dirt to grade. This operation exposed all but about 4 feet of the cast-in-place piles. Some hand labor was necessary to cut the earth out from between the piles, but in general the dirt was picked up and loaded out by the front-end shovel.

A set of 2-inch-thick timber lagging was installed vertically behind each pile as it was exposed. The chinks were wedged. Workmen wire-brushed the concrete piles to get them clean and insure a firm concrete bond when the wall was poured. Reinforcing steel was installed. The inside basement-wall face was formed by lumber panels of 1-inch sheathing nailed to 2 x 4 studs on 18-inch centers. Double 2 x 4 wales spaced 2½ feet apart were fastened with metal tie bars to the lagging on the other side.

Pours were made in sections at least 80 feet long. Builders Supply Co. is furnishing concrete in truck-mixers, which in the case of the wall pours is dumped directly into the forms. The concrete is a Class A mix designed to test 3,000 pounds at 28 days.

The timber braces were left in place until the concrete developed its designed strength. Although the wall then held the surcharge under its own power, it will also have as "spreaders" the basement floor slab near the bottom, and the sidewalk slab near the top. The 2-inch timber lagging stayed in between the cast-in-place piles and the ground. The timbers were, however, sawed off at the same level as the tops of the piles.

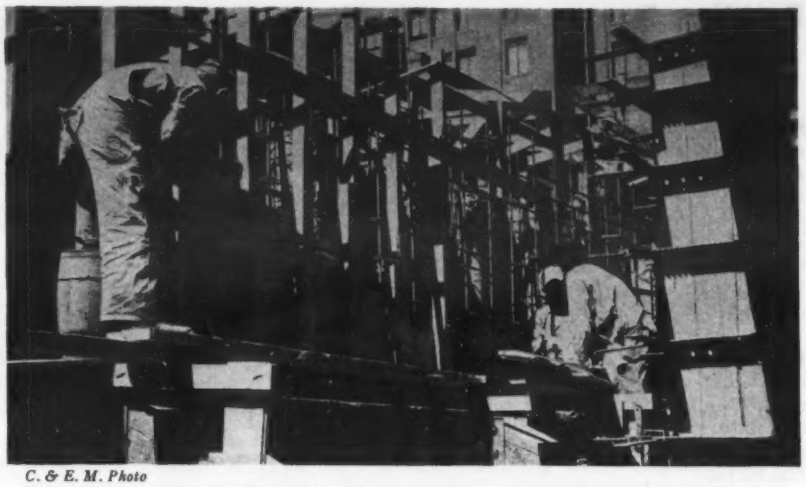
By using a great deal of care in setting the heavy braces, Tellepsen carried the construction of this tricky wall to completion without a hitch.

Structural-Framework Pads

The structural-steel uprights of the building framework rest on reinforced-concrete pads, which were poured after the fine-grading of a clamshelled area. Mosher Steel Co. is supplying the structural steel and Peterson Bros. has the subcontract for its erection. Pioneer work was done by a crawler crane, but for the most part the erection gang has used a guy derrick to erect the steel.

The welding is being carried on with great care, and test welds are cut occasionally to see that the designed

(*Concluded on next page*)



C. & E. M. Photo

Carpenters erect wooden forms to hold the south wall of the Sakowitz store in Houston, Texas. Steel is already in place.

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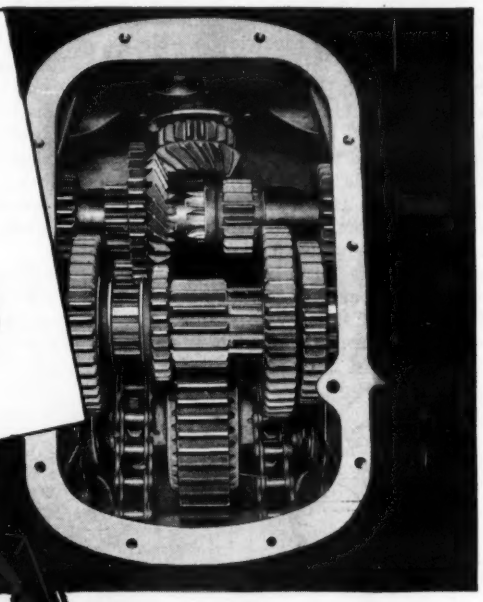

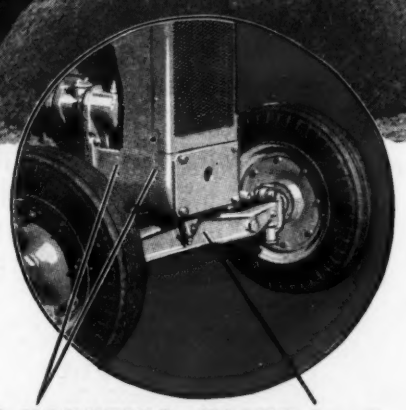

EASY MOUNTING HEAVY AXLE

A rugged, rigid casting, with tapped holes in flat front and sides, forms firm anchorage for front-mounted equipment. Power may be taken from crankshaft.

This is the trim drop-forged front axle of Model "SI," shown in action above. Extra-strong steel front axles are standard on all Case industrial tractors.

Your Case industrial dealer invites you to inspect his convenient location, competent staff, and modern service facilities. He offers Case tractors in four basic sizes from 2500 to more than 10,000 pounds... Case highway and airport mowers... complete engine units in four sizes from 24 to 61 H.P. He also offers related equipment such as tractor-mounted loaders, sweepers, snowplows, scrapers and bulldozers—all selected to suit the characteristics of Case tractors and the operating conditions that prevail in your area. He will gladly give you the benefit of his broad experience in power and equipment applications similar to yours.

● When you lift off the top cover of this Case industrial tractor transmission, you get the idea that it's built crosswise. It is! Those short, stiff shafts ride in big tapered roller bearings, adjustable from the sides of the staunch cast case which is both gear housing and tractor backbone. The spiral bevel gears give the first moderate reduction, carry only moderate load. All others are spur gears, with plenty of face width for positive lubrication and long life.

Inside the big gear on the third shaft is the differential. Motion is faster, loading is lighter and lubrication is more certain because it precedes the major reduction in the twin roller-chain final drive. This power-saving transmission is used in the mighty Model "LAI," similar designs in the next smaller Models "DI" and "SI." Get the full story on these time-saving, money-saving tractors from your Case industrial dealer. J. I. Case Co., Racine, Wis.

CASE

Building Basement Has Unusual Walls

(*Continued from preceding page*)

strength is being maintained. Lincoln and Westinghouse welding machines are being used, with A. O. Smith and Murex welding rod. R. F. Arthur is supervising the structural erection, and A. O. Reine is General Superintendent for Tellepsen Construction Co. W. E. Wiegand is in charge of office engineering.

The interior of the new Sakowitz Bros. store is being designed by Brochstein's, Inc., a Houston firm, and will be marked by many innovations in its plan and fixtures. The interior will be specially keyed to customer convenience and service.

C. & E. M. Photo
Barely a shift or two after the structural crew is out of the way on the new Houston department store, bricklayers with masonry subcontractor are plying their trades.

Big List of Subcontractors

The roster of subcontractors, in addition to those who already have been mentioned, sounds like the Who's Who of the building trade. It also gives an idea of what the finished building will be, for the firms include the following: Barber Plumbing Co., Inc.—mechanical work; Straus Frank Co.—air conditioning; J. S. Copeland Electric Co.—electrical work; Ceco Steel Products Co.—reinforcing steel; H. H. Robertson Co.—Robertson Q-flooring; South Texas Stone Co.—cut building stone; Cold Spring Granite Co.—granite blocks; Vermont Marble Co.—interior and exterior marble; Houston Iron & Steel Co.—miscellaneous iron work; James M. Pryor Co.—hollow and ornamental work, rolling steel and Kalamein doors; Shelton W. Greer—aluminum windows; Otis Elevator Co.—elevators and escalators; Pittsburgh Plate Glass Co.—store fronts, glass, and glazing; Martin Tile & Terrazzo Co.—tile and terrazzo; Paul L. Hales—masonry; Otis Massey Co., Ltd.—roofing and sheet metal; Tobin & Rooney—plastering; B. B. Bettel & Son—painting; Knobloch & V. G. Smith Co.—structural painting; and Peden Iron & Steel Co.—hardware.

Will Open for Christmas

The major goal of everyone, contractors and builders and architects alike, is to finish the new store so it can open by October 15, 1950, in time for the Christmas buying rush. The work is now proceeding at high speed, and by the time this piece is published will be covered so weather no longer will be a problem.

The completed Sakowitz Bros. store will be one of Houston's finest, and a source of pride to its builders and the community.

Corrosion Prevention

A 4-page bulletin, No. 93, issued by Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y., explains the new Metco systems for corrosion prevention. This new technique, it is claimed, prevents rust on tanks, bridges, piling, boat hulls, and fabricated steel products for 25 to 50 years.

The Metco systems provide pure zinc or aluminum coatings treated to withstand various corrosive conditions. The coating is applied directly to the steel base with standard metallizing equipment, and in most cases is given a specific organic treatment depending on the service requirements. The application of these metallized coatings is not limited in thickness, nor by the size or location of the tanks or structures, the literature explains.

Where appearance is a factor, Metcoseal color coats may be applied in a range of five colors. These may be reapplied without descaling or other preparations because the zinc or aluminum has adequately prevented oxidation of the steel, the company says.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 117.

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Your ACCIDENT PREVENTION PROGRAM will be successful when all your men *think in terms of safety*. They must be TAUGHT and REMINDED.

One of the best *reminders* is the safety message printed on paper drinking cups. It *gets home* because it is right before the man's eyes while he drinks. It is read while he relaxes — does not require extra time out — does not take his attention from his work.

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AJAX® Paper Drinking Cups

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*S*pecified densities are quickly reached in *granular* soils with the Jackson Vibratory Soil Compactor. For those areas adjacent to structures, bridges, culverts, trenches, factory floors and earth fill dam construction there is nothing that begins to equal the Jackson Compactor for speed, convenience and thoroughness of compaction. Self-propelling, the operator merely guides it. Send us a sieve analysis or small sample of the soil and we will tell you what you can expect in percentage of A.A.S.H.O. densities and depth of compaction.

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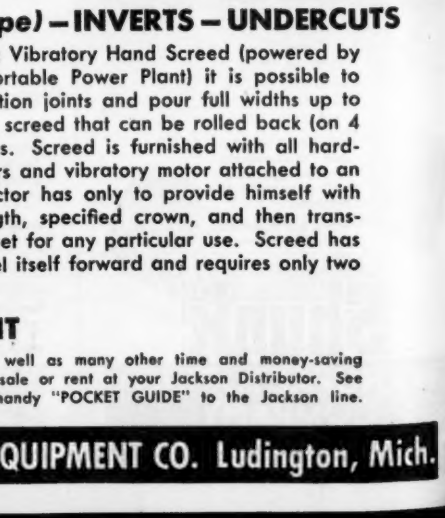
and OTHER JOBS



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With the Jackson electric Vibratory Hand Screed (powered by a Jackson 1.25 KVA Portable Power Plant) it is possible to eliminate center construction joints and pour full widths up to 30 ft. And it is the only screed that can be rolled back (on 4 rollers) for second passes. Screed is furnished with all hardware, cable, shoes, rollers and vibratory motor attached to an 8 ft. plank. The contractor has only to provide himself with a plank of suitable length, specified crown, and then transfer the hardware to be set for any particular use. Screed has strong tendency to propel itself forward and requires only two men on any width slab.

FOR SALE OR RENT

The above equipment as well as many other time and money-saving Jackson vibrators are for sale or rent at your Jackson Distributor. See them there or write for handy "POCKET GUIDE" to the Jackson line.

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The Sonco hoist tower in use on a building job in Holland. Its bucket can be swung in toward the building or to the right or left of the mast at any height.

New Hoisting Tower

A new concrete and material-hoisting tower has been introduced to this country by Techno Exports, 15 Whitehall St., New York 4, N. Y. Available in three models, the Sonco hoist will operate to heights of 300 or more feet and has capacities of ¼ yard or 1,716 pounds, ½ yard or 2,640 pounds, and 1 yard or 5,500 pounds.

The hoisting mast consists of a steel tube with channel-iron guiderails. The mast is supplied in 13 to 20-foot sections which can be quickly assembled by means of couplings, and it is attached to the scaffold or building by anchoring bolts. The bucket carriage has a safety device designed to prevent it from dropping in the event cable breaks. The rollers are bearing mounted on eccentric pins so they can be adjusted for best operating conditions. Because the construction of the carriage permits the bucket to be swung inward to the building or structure, little or no platform section is needed for buggies. Once the building is nearly complete, plaster and other materials may be loaded directly through the windows by this side-swing. The concrete hopper lifts out of the frame for replacement with a materials platform.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 100.

Heavy-Duty Jacks

A new line of heavy-duty hydraulic jacks with capacities ranging from 1½ to 100 tons has recently been introduced by the Star Jack Co., Elmwood Park, Chicago 35, Ill. All models can be used in a vertical or horizontal position with no loss of power, the company says.

The top nut and base on the new units are of pressure-tested malleable iron. The load-bearing caps are forged steel. Bases are well-ribbed to assure firm ground bearing. The jack handle must be removed from the pump socket to open the release valve on these units, Star says. A needle-point release is designed to give completely safe control in lowering operations. The pressure packing is of an oil-resistant composition. The company points out that all models up to 12 tons have telescoping extension screws in the piston or ram. All units are tested to 50 per cent overload.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 71.

Lists Films for Builders

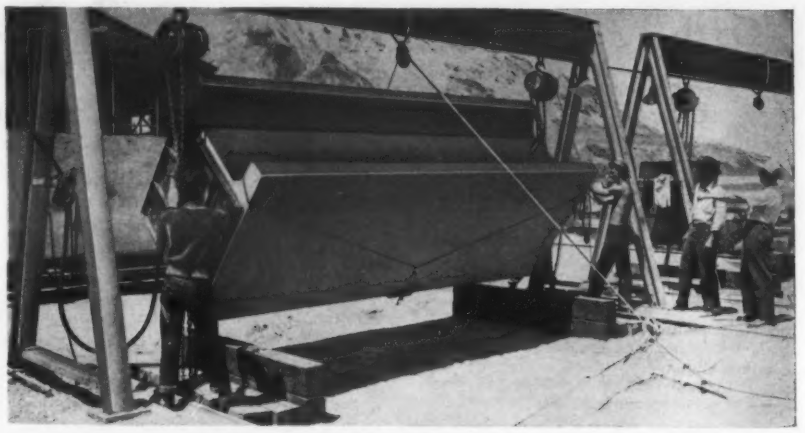
A 24-page bibliography of construction films available from building-product manufacturers has been prepared by The Producers' Council, Inc. It lists 67 films put out by 27 companies and indicates subject matter, running time, type of film, and address from which each may be requested. Most of the films are 16-mm sound movies, many in color. The running time in most cases is 20 to 30 minutes. All films are available without charge to responsible groups.

To secure a copy of the bibliography, address The Producers' Council, Inc., 815 15th St., N. W., Washington 5, D. C.

Catalog on Crane Blocks

A 4-page catalog describing high-lift crane blocks, available in capacities from 10 to 50 tons, is offered by the American Hoist & Derrick Co., 63 S. Robert St., St. Paul 1, Minn. These blocks obtain their capacity range in 9 different models in 1, 2, or 3 sheaves, 18 to 24 inches in diameter. Dimensioned drawings and complete specifications are given for each of the models. Additional information and brief specifications are also given on the standard heavy-duty crane blocks which are designed for ordinary crane operations where extra headroom is not needed.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 33.



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1400 troughs were made on a three-hour schedule with all forms removed. Vacuum lifter handles any load safely, quickly, economically. Write for information.

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THE machine that is going to make possible the handling of the widest range of contracts is the one that is going to mean the most profit for you.

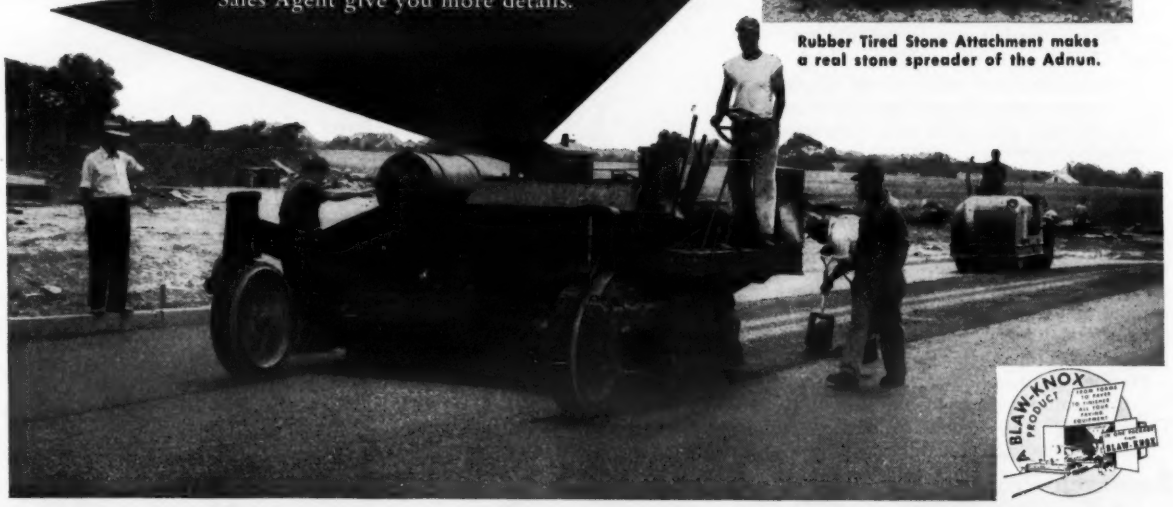
The flexibility of the Adnun Black Top Paver can't be equalled by any other piece of similar equipment. Your Adnun will lay any asphalt mix —hot or cold. It will spread stone, cinders or slag. It will lay soil cement. It has laid widths up to 13 ft. or it can spread narrow strips down to 6 ft.

In combination with the block-off sections of the hopper and the fine adjustment on the cutter bar, the Adnun will build out shoulders and "feather" the material into the existing crown without destroying the contour of the road.

This is a combination of advantages no other Black Top Paver can give you. They equip you to handle more work and a greater variety of work. Let our Sales Agent give you more details.

Look at this picture. Feathering a new shoulder into the crown. Adnun is the only machine that can do this.

Rubber Tired Stone Attachment makes a real stone spreader of the Adnun.



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Let us tell you what others are doing.

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ADNUN

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BLACK TOP PAVER

The Trenchmaster, an attachment for Ford tractors, cuts 64 inches deep and 8 to 24 inches wide, depending on the width of the bucket used. It has four forward speeds and one reverse.

Trenching Attachment

A trenching attachment for use with Ford tractors has been developed by L. W. Bennett, Inc. Factory sales are handled by the Trenchmaster Division of Service-Supply, 141 W. Main St., Alhambra, Calif. The Trenchmaster is available with 8, 12, or 20-inch bucket widths; these give a cutting range from 8 to 24 inches if extra outside teeth are used. A simple boom control enables cutting 64 inches deep and, when the job is through, raising the unit clear of the ground for travel at road speeds. A specially designed crawler transmission is installed in the tractor without altering the tractor, to give speeds from 50 to 350 feet an hour for the various trenching operations.

Power from the tractor (about 7 hp is required) is transmitted through a heavy-duty transmission, providing 4 forward speeds and one reverse for the bucket line. A reversible spoil conveyor permits dirt discharge on either side of the trench. The buckets are bolted onto a heavy-duty dry roller chain running on steel sprockets designed to provide four wearing positions. Easily replaceable shear pins in the hub on the counter drive shaft will shear if the bucket line strikes an obstruction.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 85.

Welding Electrode

An improved arc-welding electrode, the W-52 (AWS Class E7010), a reverse-polarity dc rod, has been announced by the Welding Divisions of General Electric's Apparatus Department, Schenectady 5, N. Y.

This carbon-molybdenum electrode is available in 5/32 and 3/16-inch diameters for field trial. It is designed for all-position high-quality welding of low-alloy high-tensile steels, such as pipe lines. And it can be widely applied, G-E says, in the welding of high-pressure piping and of castings where high tensile strength and resistance to creep at high pressures and temperatures are desired.

Good bonding action at the fusion zone on horizontal fillets, and less tendency to produce pin-holing on vertical down welds are said to be characteristics of the new electrode. Its stable arc with low spatter gives smooth operation and eliminates tendencies to short out in confined joint preparations, according to the company.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 88.

Research Program Expanded

McCulloch Motors Corp., Los Angeles, maker of lightweight chain saws, pumps, and other engine-powered equipment, has completed a building to be used for research. A soundproof structure, it has seven engine test cells and 7,500 square feet of floor space. Fuel storage tanks are on the roof of the laboratory and fuel is piped to a fuel room where controls permit operators to obtain exact mixtures. The research building also contains an experimental toolroom fitted with precision tools. Chemical and physical laboratories of the company are at present located in the main plant.

Heavy-Duty Tractor Trucks

Two broadsides illustrating four-point positive-drive tractor trucks have been prepared by Walter Motor Truck Co., Inc., 1001-19 Irving Ave., Ridgewood, Queens, Long Island, N. Y. The first explains the construction of Walter tractor trucks, using photographs and drawings to illustrate the drive mechanism. It discusses the applications of the trucks for snow clearing on highways and airports, on and off-highway hauling, and contracting duties.

The second folder discusses four-point positive drive, pointing out that it offers pulling power with minimum tire slip, impact, and bounce. The tractor trucks, it points out, may be powered by 200 or 260-hp diesel engines; gasoline or butane engines are also available. The trucks are illustrated in various services with a number of different truck bodies. Complete specifications of the Models ACV and AWV, each with a gross vehicle weight of 66,000 pounds, are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 31.

White Heating Kettles Have Fire-Proof Tops

Cut-back and highly inflammable road repair material can be heated safely in White kettles. FIRE-PROOF top reduces fire hazard.

White asphalt and tar kettles are extensively used. They give long life and satisfaction.

Plain kettles or with hand or engine driven spray pumps for pavement patching. Thermometers, barrel hoist, warming hood extra. All oil burning. Springs, pneumatic tires. 65, 110, 220, 300-gallon capacities. Model F-10 is oil-jacketed to heat elastic joint filler.

White Mfg. Co.

ELKHART INDIANA

Other Products

CONCRETE VIBRATORS
Gasoline Engine and Electric-Motor Driven Models

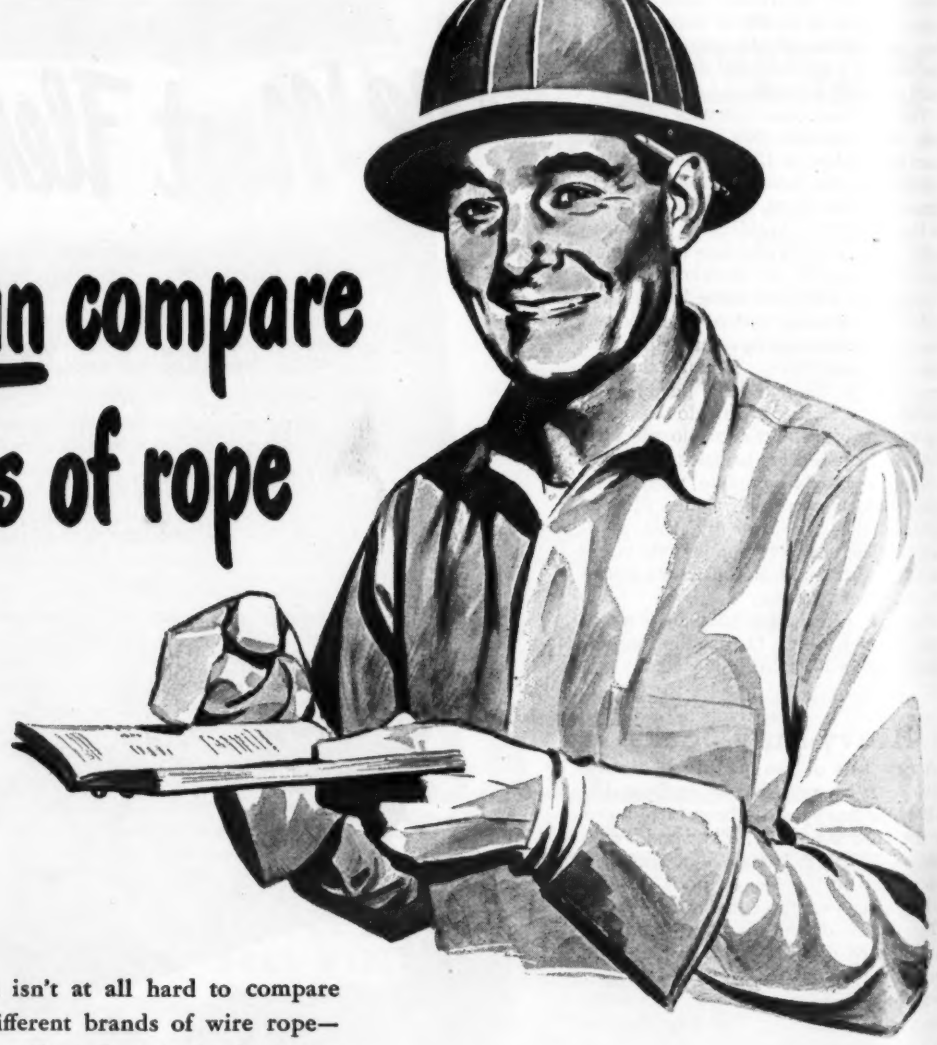
FRONT END LOADERS
for Industrial Tractors

ASPHALT PLANTS
Portable—Stationary

KEROSENE TORCHES
3 to 20-gallon Capacities

Write for Circular

You can compare brands of rope



It isn't at all hard to compare different brands of wire rope—not if you keep a simple system of records.

These records should, of course, show the work totals done by your wire ropes during their lifetime. Pick as a basis the unit of work most applicable to your line of business—a ton-mile, for instance, in oil-country drilling; a cubic yard of rock moved; a car of coal hauled up a slope, etc. When the ropes have finally been retired from service, see how much—or how little—their cost has been per unit of work.

Bethlehem has always advocated the keeping of such records. One reason (we admit it freely) is that Bethlehem wire rope is an *economical* rope, and your records will prove it. We welcome comparisons with anybody's product.

BETHLEHEM WIRE ROPE — BETHLEHEM STEEL

LET YOUR RECORDS TELL YOU!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

County Bridge Deck Torn Up and Rebuilt

Welding Speeds Transformation of Bridge Deck From Wood Block to Concrete; Traffic Uninterrupted

By R. C. McDOWELL, President, McDowell Co., Inc., Cleveland, Ohio

✦ THE Harvard-Denison Bridge is an important traffic artery over the Cuyahoga River Valley in Cleveland, Ohio. Its wood-block deck, however, became a source of high maintenance costs and was a hazard when rain made the surface slippery.

The McDowell Co., Inc., of Cleveland was awarded a contract recently by Cuyahoga County to tear out the block deck, rebuild the bridge approaches, and resurface the roadway with concrete. By the combination of a carefully planned operational sequence, a number of unique on-the-job ideas, and good crew teamwork, the 2,730-foot roadway was resurfaced and back in operation 3 months after the job was started, without interruption to the heavy flow of traffic on the bridge. This elapsed time was 2 months ahead of the contact schedule.

A heavy timber safety curbing was erected down the middle of the bridge and one-half of the roadway was completed before the other half was started. Two crews of 30 men each were put to work simultaneously at opposite ends of the bridge and, following the same sequence of operations, worked toward the center. Each crew had similar equipment. The crews were soon pacing themselves against each other, developing a friendly competitive spirit and good teamwork. The resulting top performance from the men did much to help finish the job ahead of schedule.

The following operations were done simultaneously and by each gang, although the relative progress of each operation varied between crews.

Operations Step by Step

The first job was the removal of the wood blocks, which were scraped up and put into trucks by tractor-mounted loaders. Following this operation was a crew cutting the old streetcar track ties with a compressed-air-driven chain saw and ripping up the old deck with a 20-ton crane. Another crew followed the cranes removing and repositioning old underframe girders and adding new structural beams and expansion joints. A total of 422,250 pounds of old steel underframe was repositioned and 665,845 pounds of new structural beams added.

(*Continued on next page*)

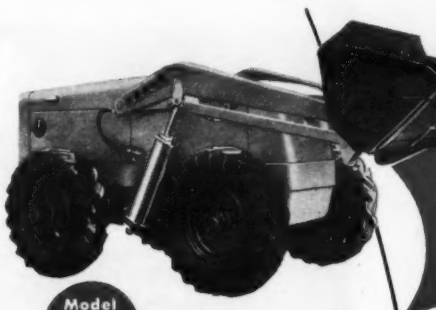
As the first step in reconstruction of the Harvard-Denison Bridge, Cleveland, Ohio, the old wooden roadway blocks were removed.

IS RE-ROPING ONE OF YOUR "Headaches"?

If so—look to Electroline Wire Rope Fittings! These permanent wire rope fittings prolong the life of wire rope by damping vibration stresses and overcoming rope fatigue at entrance to fittings—**Electroline Fittings Definitely Minimize Re-Roping!**

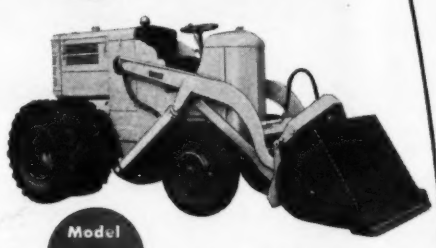
But this is just one of the many outstanding advantages of these positive-grip fittings. Send for illustrated, pocket-size Catalog and learn how you'll profit by using Electroline Wire Rope Fittings.

Electroline Company
4121 SOUTH LA SALLE STREET
CHICAGO 9, ILLINOIS



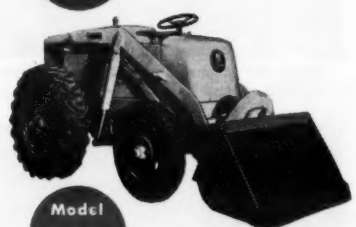
There is Only One PAYLOADER

Model HM — 1½ cu. yd., 4-wheel drive, 76 HP, Gas or Diesel

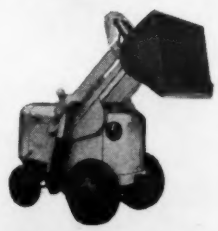


Model HL — 1¼ cu. yd., 55 HP, Gas or Diesel

Model HF — ¾ cu. yd., 53 HP



Model HE — ½ cu. yd., 34.5 HP



Model HA — 12 cu. ft., 29 HP

"PAYLOADER" is the exclusive name applying to Hough-built tractor-shovels, and "PAYLOADERS" are exclusive because they are complete tractors and shovels — not attachments for tractors.

Tractor and shovel are a unit design with speed, stability, operator comfort and visibility, and ease of operation "built-in" to provide the maximum in tractor-shovel performance, versatility and usefulness.

There are Five PAYLOADERS

"PAYLOADERS" comprise a complete graduated line of sizes — five models from 12 cu. ft. to 1½ cu. yd. bucket capacity. You can choose the one that will just fit your requirements. They all incorporate many superior "PAYLOADER" tractor-shovel features — several speeds in each direction; automatic, powerful bucket crowd and bucket tip-back; full hydraulic bucket control; hydraulic brakes; quick, easy reverse shifting.

There are Thousands of PAYLOADERS

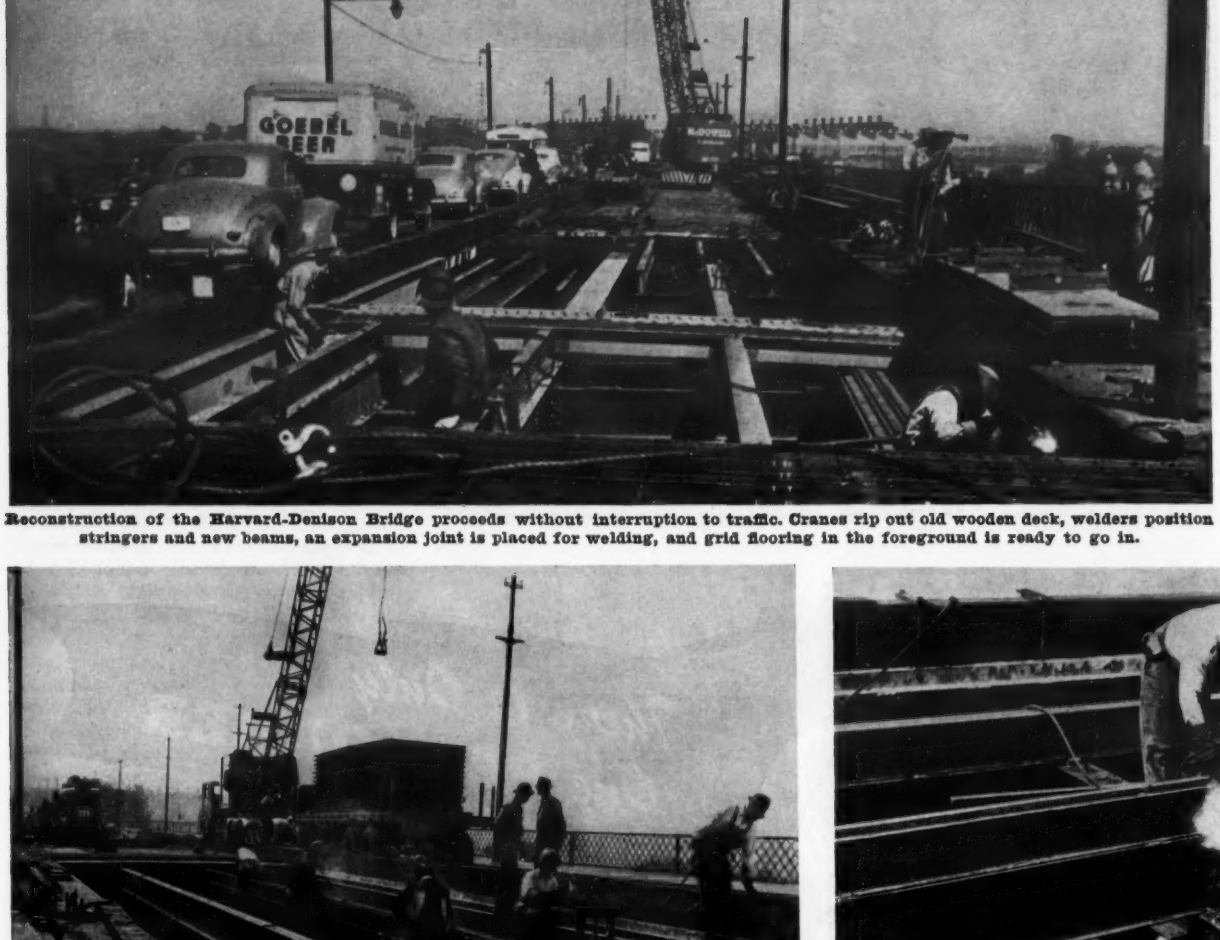
The thousands of "PAYLOADERS" in use are the real proof of the superiority of these unit-built tractor-shovels. They are being used to dig, load trucks, excavate, level, grade, carry, bulldoze, backfill, strip, push, lift and handle materials.

Unsurpassed in versatility, fast *to* the job under their own power and fastest *on* the job — those are the facts about "PAYLOADERS" that have made them the choice of men who know tractor-shovels. Your Hough Distributor is ready to tell you what "PAYLOADERS" can do for you. See him today or write The Frank G. Hough Co., 762 Sunnyside Avenue, Libertyville, Illinois.

SAY "HUFF"

PAYLOADER®

Manufactured by THE FRANK G. HOUGH CO.



Reconstruction of the Harvard-Denison Bridge proceeds without interruption to traffic. Cranes rip out old wooden deck, welders position stringers and new beams, an expansion joint is placed for welding, and grid flooring in the foreground is ready to go in.

County Bridge Deck Torn Up and Rebuilt

(Continued from preceding page)

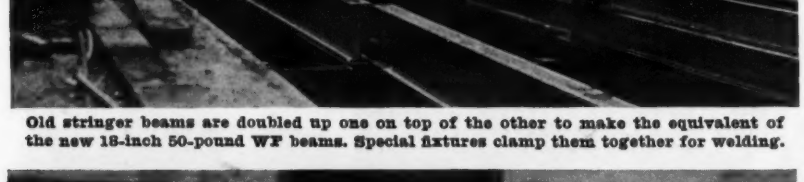
As the underframe was welded in position, another crew placed the new 4¼-inch I-grid deck. This operation was followed by the welding gang which welded the floor deck sections together, to the stringers, and to expansion joints. Concrete filling was started after 4 weeks of progress had been made by the steel crews, and was finished in 2 weeks. The first half of the bridge was completed in 6 weeks and the second half was finished in 4 weeks' time.

Welding Develops Short Cuts

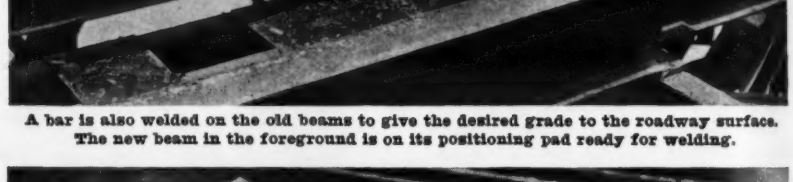
The accompanying illustrations show a number of the unusual features of this job, many of which, it will be noticed, center around the use of arc welding to develop short cuts and savings. Welding equipment itself was

(Concluded on next page)

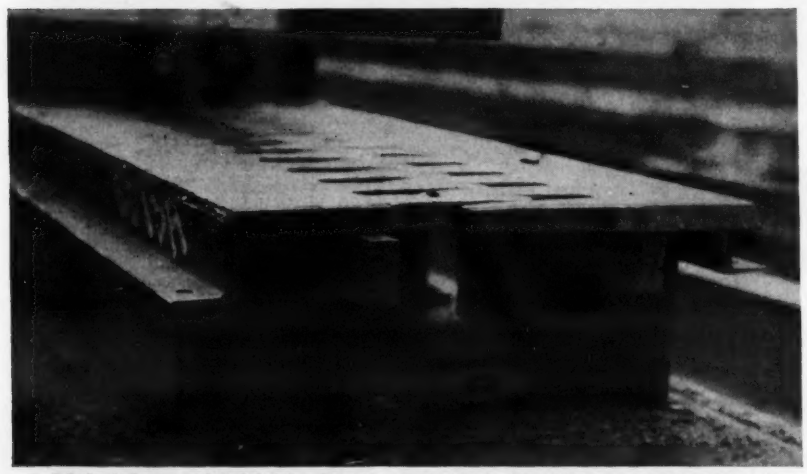
Lincoln Electric Co. Photos



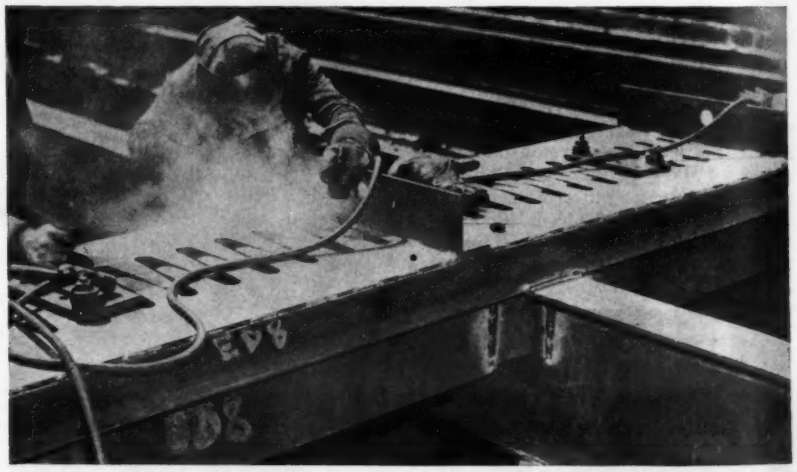
Old stringer beams are doubled up one on top of the other to make the equivalent of the new 18-inch 50-pound WF beams. Special fixtures clamp them together for welding.



A bar is also welded on the old beams to give the desired grade to the roadway surface. The new beam in the foreground is on its positioning pad ready for welding.



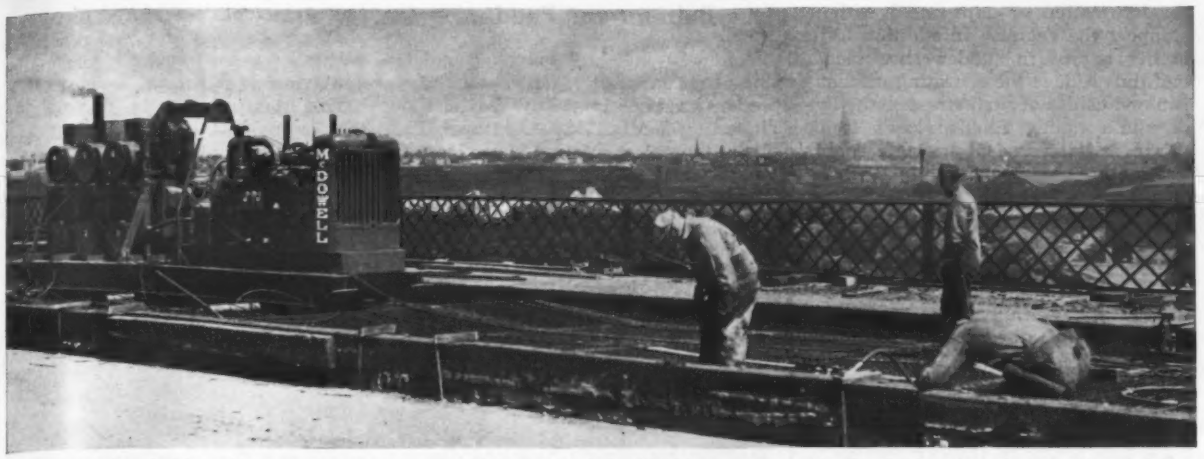
A fabricated expansion joint in close-up. Plate 1¼ inches thick was flame-cut up the middle to produce the matching joint and then welded to angle and channel as shown.



Here the expansion joint, held across the top by a temporary welded angle clip, is welded to the flange of a new stringer beam and to the web with a small angle clip.

To maintain surface grade while grid flooring is welded to stringers: a jack pushes against a piece of rail on the grid and a hook clamps the floor to the inside stringer beam. A Yale hook and chain winch pulls grid sections into place.

Finally, the expansion joint is welded to the grid floor. The McDowell Co., Inc., of Cleveland had the 2,730-foot roadway resurfaced and back in operation 3 months after the job was started—2 months ahead of the contract schedule.



McDowell designed this welding rig: six Lincoln dc welders on a sled with a 100-kw generator driven by an International diesel engine.

unusual in that two specially designed power units were used.

Welding crews on each end of the bridge used units incorporating six standard motor-generator welding sets made by The Lincoln Electric Co. The welders were built into a special portable power unit which could be moved as the work progressed. The six welders were mounted on a sled with a 100-kw diesel-driven generator. The generator produced 220/3/60 power for operating the six welding sets and was driven by a UD-24 International diesel engine.

This arrangement for operating the dc welding sets proved to be highly economical on this job. It eliminated the expense of a temporary power installation, and the operation of the two diesel units proved to be cheaper than operating a number of gas-engine-driven welders. The two diesel units consumed approximately 52 gallons of fuel oil a day, which resulted in a cost of one cent per kilowatt. The power unit had ample capacity to permit the six welders to operate simultaneously and a reserve to operate two more, or a total of eight, when needed.

The welding on the job consisted of first welding stringer beams to the bridge underframe. Two of these beams were old steel repositioned, while three were new steel. The old beams were doubled up one on top of the other to make two beams out of four—the equivalent of the new 18-inch 50-pound WF beams. Bars were also welded on top of the old beams to create the desired grade in the roadway.

The 36 fabricated expansion joints for this bridge were also welded. The joints were made by flame cutting through the middle of a 1¼-inch plate. The two halves were then welded to an underframe of channels and angles. For transporting and placing, the whole expansion joint was tied together with two clip angles temporarily welded across the joint. After the joint was welded into place on the stringers, the clip angles were removed.

Progress Engineer on the job for the McDowell Co., Inc., was A. R. Schlueter; Field Superintendent was Ray Johnson.

Standard Grader Converts To Elevating-Grader Work

Literature on the new DoMor attachment, which converts a standard motor grader to elevating-grader service, has recently been offered by Ulrich Products Corp., of Roanoke, Ill. Designed for installation on a No. 12 or No. 112 Caterpillar motor grader, the new tool makes it possible to cast, load, or terrace with speed and economy, the literature says. The grader may easily be converted from blade to elevating work and back again.

Offered in the form of loose-leaf circulars, the literature gives full specifications, explains features of construction and design, and illustrates the unit at work.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 76.

RENT
these cost-reducing forms for concrete

Cost records from job after job prove that Economy's system of Form Engineering and Rental Service means substantial savings in TIME—MATERIAL—MONEY for GREATER PROFITS.

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HOME OFFICE • DES MOINES, IOWA

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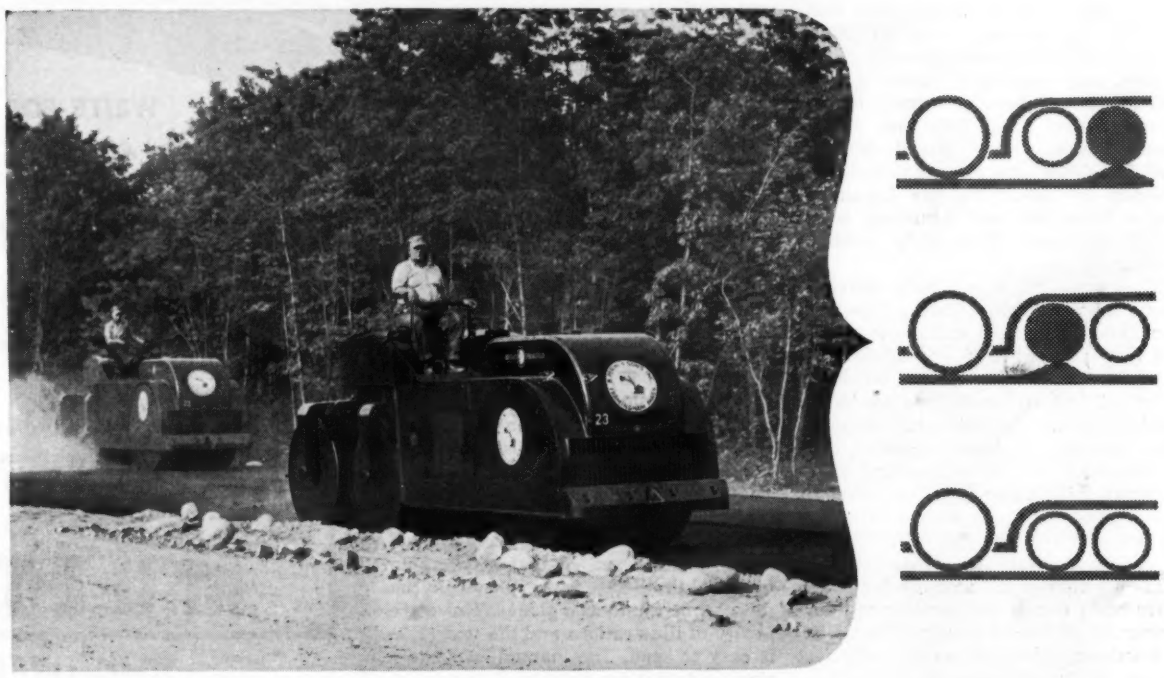
ECONOMY METAL FORMS



What is 3-AXLE SMOOTHNESS?

The answer to this question is a matter of record. By actual test, it is the highest degree of road surface smoothness ever attained with tandem roller. A leading state highway department proved that the Buffalo-Springfield 3-axle tandem produces surfaces 50% smoother than the average obtained with conventional tandems of equal capacity. Also noteworthy, the same test showed that the 3-axle tandem averaged 60% more tonnage compacted than other units on the project. As a result, the specifications for asphaltic surfaces in this state now permit the use of one less tandem roller with each spreader, *provided* a 3-axle tandem is one of the rollers employed.

Still another state specifically requires the use of a 3-axle tandem on certain plant mix surfaces.

There's a reason for this greater work capacity and smoother rolling results. The two large diameter guide rolls and the drive roll of the 3-axle tandem are rigidy mounted in a position tangent to the same plane. Thus, when one guide roll strikes a high spot in the pavement, the other is lifted clear of the surface and its weight transferred to the rolls retaining surface contact. Result—maximum compactive effort where it is needed most—on the high spots in the surface.

You can learn more about this transfer-of-weight principle and the many other exclusive features of the Buffalo-Springfield Model KX-25, 12 to 19 ton, 3-axle tandem from your nearest distributor. Why not call him today?

---Mail This Coupon Today---
THE BUFFALO-SPRINGFIELD ROLLER CO.
Dept. F-8, Springfield, Ohio
☐ Please send me Catalogue S-56-49 describing the right model for my requirements.
☐ Notify Distributor to call.
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ADDRESS .....
CITY ..... STATE .....

BUFFALO SPRINGFIELD
THE STANDARD OF COMPARISON
SPRINGFIELD, OHIO

The Lorain 50 Series turntable has been modified and mounted on new heavy-duty rubber-tired carriers to give two new 25-ton convertible cranes: the Models MC-504 and MC-504W.

New 25-Ton Cranes Are Rubber-Mounted

Two new Lorain rubber-tired convertible cranes—each rated at 25-ton lifting capacity on outriggers at 10-foot radius, and capable of working with 130-foot booms—are announced by The Thew Shovel Co., 28th and Fulton Road, Lorain, Ohio. Models MC-504 and MC-504W are new machines developed by modifying the Lorain 50 Series turntable and mounting it on newly designed heavy-duty rubber-tired carriers.

The Moto-Cranes are fully convertible to shovel, clamshell, dragline, and back hoe. Standard crane booms are 100 feet long, with 15 and 30-foot tip extensions available. Shovel booms of 19 or 21 feet in length are available. Buckets have a 1-cubic-yard capacity. The back-hoe equipment consists of a 19-foot-long hoe of all-welded construction with a gooseneck or offset to give it greater digging range. The hoe dippers are available in 30, 36, 40, 44, 46, and 48-inch cutting widths.

The turntables of these machines are powered by 6-cylinder gasoline engines. Power is delivered through a Twin Disc hydraulic-coupling power take-off, and thence by a multiple-strand roller-chain drive to the operating mechanism. The power take-off includes a plate-type disengaging clutch which permits disengaging and stopping all mechanism for lubrication or adjustment without stopping the engine. In addition to its ability to absorb sudden shock loads and thus relieve the operating mechanism and cables of such stresses, the hydraulic coupling enables loads to be raised and lowered at variable speeds under the control of the gas-engine throttle.

The Model MC-504W wide-track model consists of a 3-axle carrier, 118 inches in overall width over the rear tires, with driving power applied to the two rear axles as a 6 x 4. A front driving axle may be installed to make the MC-504W a 6 x 6. The Model MC-504 is identical with the MC-504W except for a narrower width of 102 inches over the rear tires. It is available only as a 6 x 4 with power on the two rear axles only.

Power for the carrier is supplied by a separate 6-cylinder gasoline engine mounted in the carrier and rated at 220 hp. The units have a total of 10 forward speeds and 2 reverse speeds. All models are equipped with Bendix-Westinghouse Air Assist steering which is synchronized with and functions automatically with manual steering to reduce the driver's steering effort.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 72.

New Installation Guide For Water and Sewer Pipe

A new 118-page booklet, written especially for the men who handle or direct the installation of Transite pressure pipe, is offered by Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y. It discusses the receiving and handling of pipe, excavating the trench, supporting the pipe, lowering into the trench, assembly of pipe and couplings, cutting methods, assembly at fittings, installation at hydrants, making service connections, methods of backfilling and tamping, pressure and leakage tests, and methods of repairing damaged pipe.

Contents of the manual are arranged for easy reference so that answers to practical problems, as they occur on the job, can be found at a glance. There are plenty of illustrations and the text style is easy to read. The manual is pocket-sized so that it can be carried around on the job.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 52.

Bulletin on Feeders

A new 20-page bulletin on a complete line of apron, grizzly, table, and slurry feeders has been issued by Traylor Engineering & Mfg. Co., Allentown, Pa. Fully illustrated cutaway views of each type of feeder show interior construction and exclusive features. Installation photographs show the feeders working with all types of crushers, rotary kilns, and grinding mills.

This literature may be obtained from the company by requesting Bulletin 1114, or by using the Request Card at page 16. Circle No. 18.

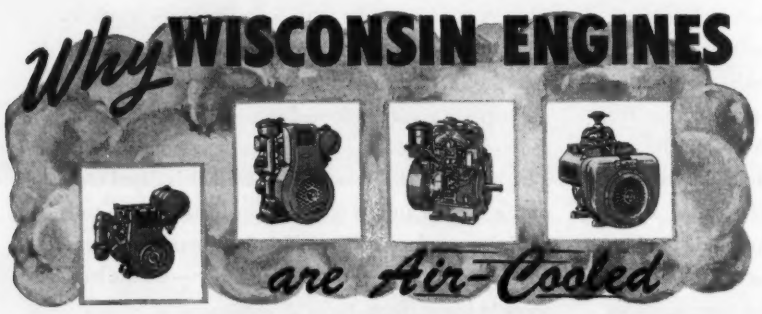
MR. ASPHALT PLANT OWNER

YOU TOO CAN SAVE FUEL
AND INCREASE PRODUCTION
BY USE OF
HOPKINS' VOLCANIC
LOW PRESSURE BURNING EQUIPMENT

WRITE FOR QUESTIONNAIRE
AND DESCRIPTIVE FOLDER

Hopkins' Volcanic Specialties, Inc.
ALLIANCE, OHIO

Why WISCONSIN ENGINES



are Air-Cooled

Air-Cooling, as developed and perfected by Wisconsin Motor Corporation engineers, has these important advantages for the power user:

1. Greatest freedom from cooling chores and troubles. More Service FROM the engine, less service TO the engine; fewer Man-Hours lost; more H.P. Hours on the job.

2. Most efficient cooling at all engine speeds and all temperatures, from sub-zero to tropical highs. The engine never runs out of AIR!

3. Lowest maintenance cost. Integrally cast flywheel fan eliminates all cooling "accessories" . . . nothing to get out of order, wear out, or require replacement.

4. Lighter engine weight and greater compactness . . . for most convenient portability and greatest installation adaptability as power components on original equipment.

Every Wisconsin Engine from the smallest to the largest (3 to 30 hp., single cylinder, 2-cylinder and 4-cylinder) has all the advantages of dependable AIR-COOLING, plus heavy-duty design and construction throughout.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46 WISCONSIN

The Ninth of a Series in the interest of more efficient use of steel . . . a vital American resource

LACLEDE MULTI-RIB REINFORCING BARS

NOW . . . Available by Number in Standard Sizes of New A.S.T.M. Serial Designation A305-49 Table I

Thanks to A. S. T. M. specification A305-49, designers now have a more efficient bar for concrete reinforcement . . . one that provides **increased anchorage** which when properly used will give appreciable **savings in steel and concrete.** Advanced design Laclede Multi-Rib Reinforcing Bars exceed the A305-49 specification. They are available in uniform round sections in all standard sizes and can now be ordered by number.

TABLE I A.S.T.M. SERIAL DESIGNATION A305-49

Dimensional Requirements for Deformed Steel Bars for Concrete Reinforcement

		NOMINAL DIMENSIONS ROUND SECTIONS			REQUIREMENTS OF DEFORMATIONS		
Bar No.°	Unit Wt. Lbs./Ft.	Diameter-Inches Decimal	Cross Sectional Area Sq. Inches	Perimeter	Max. Avg. Spacing Inches	Min. Height Inches	Max. Gap Inches ‡
3	0.376	.375	0.11	1.178	0.262	0.015	0.143
4	0.668	.500	0.20	1.571	0.350	0.020	0.191
5	1.043	.625	0.31	1.963	0.437	0.028	0.239
6	1.502	.750	0.44	2.356	0.525	0.038	0.286
7	2.044	.875	0.60	2.749	0.612	0.044	0.334
8	2.670	1.000	0.79	3.142	0.700	0.050	0.383
9*	3.400	1.128	1.00	3.544	0.790	0.056	0.431
10*	4.303	1.270	1.27	3.990	0.889	0.064	0.487
11*	5.313	1.410	1.56	4.430	0.987	0.071	0.540

*These sections have the same weight and area as bars formerly known as 1" Sq., 1⅛" Sq. and 1¼" Sq.
‡Chord of 12½% of Nom. Perimeter.
°Bar numbers are based on number of ⅛" included in the nominal diameter of the bar section.

— Write us —
About specifing LACLEDE MULTI-RIB BARS on your jobs

LACLEDE
Producers of Construction Steel
LACLEDE STEEL COMPANY
St. Louis, Mo.

Distributor Doings

Thor Dealers Meet on Boardwalk

Some 300 distributors, their wives and guests, attended the annual Thor reception which highlighted the 1950 Industrial Supply Convention in Atlantic City last May. During the three-day conclave along the boardwalk, George G. Weaks, President of Weaks Supply Co., Ltd., Thor electric-tool distributor in Monroe, La., resigned the gavel of the Southern Supply & Machinery Manufacturers Association to a long-time friend, Joe W. Pitts, of Brown-Roberts Hardware & Supply Co., Ltd., Alexandria, La. James H. Ruddell, of Central Rubber & Supply Co., Indianapolis, was elected President of the national association.

Distributorships for Fiber Forms

Sonoco Products Co. of Hartsville, S. C., is interested in obtaining additional distributors for its Sonotubes, laminated fiber forms which provide a practical and economical method of constructing concrete piers and columns up to 24 inches in inside diameter. For further information, write to the company.

Service Supply Opens in Lancaster

Service Supply Corp., Philadelphia distributor of construction and material-handling equipment, has opened a new service and sales branch at 234 N. Prince St., Lancaster, Pa. It will handle service, parts, sales, and rentals of P&H, Jaeger, LaPlant-Choate, Thor, Gradall, Universal, Haiss, Mandt, Pettibone Mulliken, Brooks, Gar-Bro, Gerlinger, and Sicard equipment. Bill McNichol, formerly with Stow Vibrator Co., will be in charge in Lancaster.

Dealers See Cummins Engine in Race

Cummins Engine Co., Inc., Columbus, Ind., began its annual dealer meeting with a bang—the bang of the starting gun for the annual Indianapolis Memorial Day race classic. The Cummins Diesel Special had been entered in the "500", and hundreds of company customers, vendors, and dealers watched until it was forced out of the race when a torsional vibration damper failed after 52 laps. Races over, special buses took the company's guests back to Columbus to a plant open house.

Rish for Telsmith in Cincinnati

Rish Equipment Co., Dalton and Hopkins St., Cincinnati, is covering the Cincinnati, Ohio, territory for The Smith Engineering Works, Milwaukee manufacturer of Telsmith crushers. The territory also includes a few counties in Indiana and Kentucky. Rish represents Telsmith in Virginia and West Virginia, too, from its offices at Roanoke, Richmond, Charleston, Clarksburg, and Bluefield.

Indiana's B-E Territory Enlarged

The Indiana Equipment Co., Inc., of Indianapolis and Fort Wayne, now sells and services the Bucyrus-Erie line of general-purpose excavators in 14 counties in northwestern Ohio: Williams, Fulton, Lucas, Defiance, Henry, Wood, Paulding, Putnam, Hancock, Van Wert, Allen, Hardin, Mercer, and Auglaize. James R. Schultz, well known in the Fort Wayne area, will represent Indiana in its new Ohio territory.

Demonstrates Road Resurfacing

County, state, and municipal officials of southern Illinois were on hand June 6 for a premiere showing of a new method of reclaiming road surfacing materials. The demonstration was arranged by the John Fabick Tractor Co., Athey and Caterpillar distributor for the area, and Athey Products Corp. The Athey Force-Feed Loader and portable breaker combination was the star that day.

The new method of reclamation starts with a motor grader scarifying and windrowing the old surface. Then the loader picks up the windrowed material and shoots it via belt into the hopper of the towed portable breaker where it passes through an impact-type hammermill. Reduced to the gradation desired, the material is ejected in windrows to the rear of the breaker. The reduced material is then given a shot of oil, blade-mixed or re-run through the loader-breaker, and spread and rolled into a new surface.

In a demonstration arranged by John Fabick Tractor Co. and Athey Products Corp., an Athey Force-Feed Loader and portable breaker combination reclaims an old Illinois road. It picks up, crushes, and returns to subgrade the old surfacing material.

On the black-top Carrier Mills road,

(*Continued on next page*)

AMERICAN
Deluxe Concrete
WHEELBARROW

Code
PERFECT
15 Gauge
seamless tray

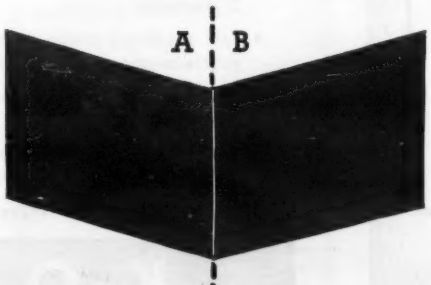
The American Steel Scraper Co.
SIDNEY OHIO

from test-tube to black top...

DARAKOTE is the anti-stripping additive that is chemical-engineered to the job! From laboratory through pilot plant to full-scale production, ***DARAKOTE*** is backed by Dewey and Almy Chemical Company's 30 years' research and industrial chemistry know-how . . . pointed up by 16 years' experience in the manufacture of products for the construction and paving industries.

The engineering knowledge and research facilities behind ***DARAKOTE*** pay off on the job, where ***DARAKOTE*** is setting new standards of performance. ***DARAKOTE*** makes it possible to coat wet, moist, or dry paving aggregates with liquid bituminous materials . . . insures positive adhesion . . . despite bad weather conditions during and after construction. ***DARAKOTE*** treated asphalt maintains its effectiveness, eliminates the need for "sweetening-up" with more additive.

For asphalt cements, cut-back asphalts, road oils, road tars . . . ***DARAKOTE*** is a more efficient anti-stripping additive.



A WITHOUT *DARAKOTE*
Unretouched photo taken 24 hours after application shows extensive stripping of surface course under traffic after heavy rain.

B WITH *DARAKOTE*
Adjoining section of same pavement under same conditions of traffic and rain is entirely free from stripping.

for detailed information about *DARAKOTE*, write

Dewey and Almy Chemical Company

Cambridge 40, Mass. • Chicago 38 • San Leandro, Calif. • Montreal 32

Distributor Doings

(*Continued from preceding page*)

a strip 450 feet long and 22 feet wide was reworked in 69 minutes—there were 162 cubic yards in the strip. On a gravel road 4 miles west of Harrisburg, the strip was 700 x 12 feet. With windrows running to 2 cubic feet per linear foot, the Athey team handled 70 cubic yards in the 30 minutes it took to complete one windrow, and 111.55 cubic yards in the 37 minutes on the second windrow.

Want to Handle Concrete Drills?

The Specialty Co. of New York City has recently been appointed sales agent east of the Mississippi for products made by Concrete Termite Drill Co. of Pasadena, Calif. Specialty Co. is interested in obtaining distributors for the drill bits, so write to the firm at the Empire State Bldg., New York 1, N. Y.

Illinois Company Changes Name

The Melrose Park, Ill., equipment distributor formerly known as Stockberger-Seastorm, Inc., is now called Illinois Contractors Machinery, Inc. It is at 2200 Manheim Road.

Sells Plaster-Concrete Bond Tools

Hohmann & Barnard Corp., 214 E. 33rd St., New York City, has accepted a distributorship for Buffalo Products, Inc., Buffalo, N. Y., manufacturer of Kifs, which are designed to form a lathless, mechanical bond between concrete and plaster. Kifs may be purchased or rented.

On a Missouri River Basin job site, contractor-dealer J. D. Armstrong (in the plane) delivers replacement parts right to his foreman, Harlan Nibe. J. D. and Max Armstrong are co-owners of Armstrong Tractor & Truck Co., International Harvester Co. dealer in Ames, Iowa, one of their many activities.

Earth Work, Hauling, Distributing: One Thing Leads to Another in Iowa

Before he graduated from high school, J. D. Armstrong, now President of J. D. Armstrong Co., Inc., Ames, Iowa, owned a farm tractor and did custom plowing in Humeston, Iowa, his home town. Money from plowing and from a 4-H Club sheep project put him through the first two years at Iowa State College.

During the summer before his junior year, the need for more money sent J. D. back to the earth—not to the fields this time, since fields are not plentiful enough to be profitable in middlewestern cities—but to digging basements and hauling coal. J. D. had replaced his plow with a shovel.

According to an old middlewestern saying, you can't keep a good man down, and shortly after he graduated from Iowa State in 1937, J. D. and his shovel left basements behind. Contracts for football fields, golf courses, and highway work were beginning to appear. At 29 he was superintendent of all earth work on the $79,000,000 Des Moines Ordnance Plant.

Continued demands by construction firms for efficient movement of heavy equipment prompted J. D. to organize Armstrong Heavy Hauling, Inc., which now operates under Interstate Commerce Commission regulations in nine states. In connection with this heavy hauling, Armstrong designs and manufactures special heavy-duty low-bed trailers, and push-plates for all types of crawler tractors.

Near the end of World War II the Armstrong Tractor & Truck Co., International Harvester Co. dealer in farm equipment and motor trucks, was formed by J. D. and his brother Max, who now manages the dealer company. Newest of the Armstrong interests is Armstrong-Nash, Inc., organized in 1944. It is next door to the distributor company and is managed by Robert Hannay.

(*Concluded on next page*)

TEAM UP THIS STANDARD STEEL S-J WITH A STANDARD STEEL TAR KETTLE FOR LOW COST ROAD MAINTENANCE!

STANDARD STEEL TAR KETTLES

✔ You get three separate operations from Standard Steel Tar Kettles. (1) Hand operated spray assembly; (2) Motor operated, and (3) Gravity Draw off for bucket work. Uniform heat throughout mass of material eliminates "cold spots" or "burnt materials." Team up an "S-J" and a Standard Steel Tar Kettle and you can handle any repair work or secondary construction at less cost—less work—with less investment in equipment. Write for Catalog "TK".

STANDARD STEEL "S-J" for SECONDARY CONSTRUCTION

✔ Whether used for construction of playgrounds, driveways, parking areas, or for patching, sealing, shoulder repair or crack filling, Standard Steel "S-J" works fast—economically—efficiently.

SAVES WORK — a special "SUCK BACK" element cleans spray bar instantly after shutting off flow of material.

NO DELAYS STARTING — pump and entire piping system is instantly drained after completing a job — eliminating freezing and loss of time on *starting next job.*

SAFETY — Gravity Draw off on curb side protects operator.

Write for Catalog "S-J" for Further Details

OTHER PRODUCTS

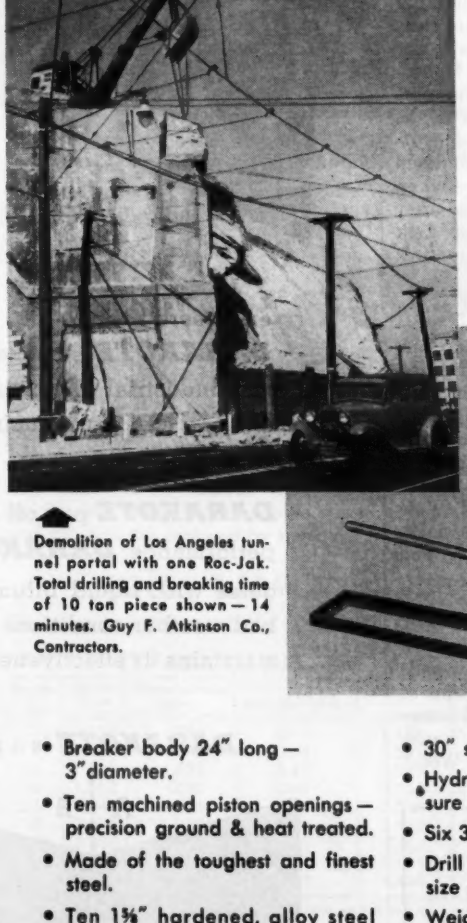
Asphalt Pressure Distributors, Patch Rollers, Supply Tanks, Tool Heaters, Asphalt Tools, Street Flushers, Construction Brooms and Aggregate Spreaders.

Built to the Highest Standard

Standard Steel Works NORTH KANSAS CITY MO

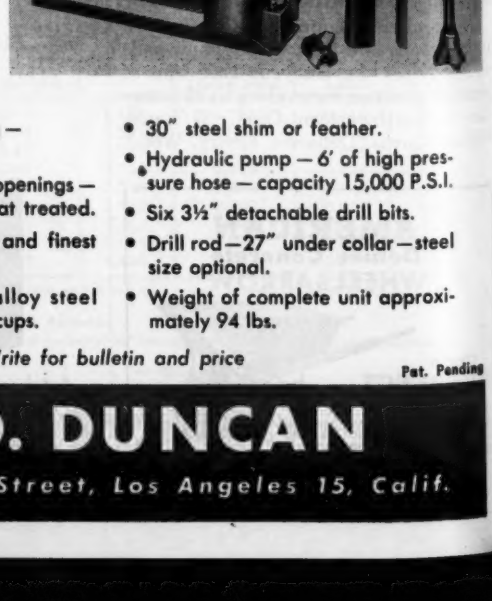
SJ6

When the man says NO BLASTING use a Duncan HYDRAULIC ROC-JAK®! FOR HEAVY CONCRETE DEMOLITION



The Duncan Roc-Jak performs a quick, economical job in the demolition of mass concrete or cemented brick, where the use of explosives or ball drop is prohibited or impractical. The Jak—rugged and of simple operation will function in any position. Noiseless, dustless and safe.

Type 10 Duncan Hydraulic Roc-Jak — weight 94 lbs. Develops 150 ton thrust pressure in 3 minutes.



Demolition of Los Angeles tunnel portal with one Roc-Jak. Total drilling and breaking time of 10 ton piece shown — 14 minutes. Guy F. Atkinson Co., Contractors.

- Breaker body 24" long — 3" diameter.
- Ten machined piston openings — precision ground & heat treated.
- Made of the toughest and finest steel.
- Ten 1⅜" hardened, alloy steel pistons with neoprene cups.
- 30" steel shim or feather.
- Hydraulic pump — 6' of high pressure hose — capacity 15,000 P.S.I.
- Six 3½" detachable drill bits.
- Drill rod—27" under collar—steel size optional.
- Weight of complete unit approximately 94 lbs.

Write for bulletin and price

Pat. Pending

K. O. DUNCAN

1350 Wright Street, Los Angeles 15, Calif.

Distributor Doings

(*Continued from preceding page*)

Armstrong stresses safety as the big factor of his success in the heavy-construction business, and in 1949 the Associated General Contractors of America, Inc., gave him a plaque for practicing what he preaches: his firm stood first in the Group B highway division for its accident-prevention record.

Vibrator Dealers, Coast to Coast

Several equipment dealers ranging from the east to the west coasts have been named to handle internal and external vibrators and soil compactors made by Vibro-Plus Products, Inc., of Woodside, Long Island, N. Y. They are Air-Mack Equipment Co., Seattle, Wash.; P. L. Crooks & Co., Inc., Portland, Oreg.; Le Roi-Rix Machinery Co., Los Angeles; Pearson Bros., Inc., New York City; and Equipment Rental Co., of Pittsburgh, Pa., and Baltimore, Md.

Several territories are still available, and all inquiries from dealers are welcomed.

Traffic-Line Marker Dealerships

A number of distributor territories are available for a new traffic-line marker made by the Gledhill Road Machinery Co., Galion, Ohio. For further information, get in touch directly with the company at the above address.

Three New Agents for Smith

Three new dealer appointments have been announced by Smith Engineering Works, Milwaukee, manufacturer of rock crushers, conveyors, screens, etc. For Iowa, it has named Hawkeye Machinery Co., 1225 Walnut St., Des Moines; for South Dakota, Empire Equipment Co., 828 N. Main Ave., Sioux Falls; for western Missouri and all of Kansas, Newlin Machinery Co., 641 Southwest Blvd., Kansas City, Kans.

Outlets for Post-Hole Digger

Distributors and dealers interested in handling a post-hole digger that fits any tractor or Jeep with hydraulic lift should get in touch with Roper Mfg. Co., Department H, Zanesville, Ohio. Some territories are still open.

New Florida Dealer for Heil

The Chapman Machinery Co., Tampa, new distributor for The Heil Co., of Milwaukee, will sell and service Heil bodies and hoists in Florida. J. C. Chapman organized the distributor company in 1943 and has made it a leader in the construction-equipment field. Three salesmen cover 18 counties in southwestern Florida and sell a wide range of big-name products to road builders and contractors.

Engine Dealer in Kansas City

The Power Equipment Co., Kansas City, Mo., has been named representative for the sale of the new Lima-Hamilton 21½ x 27½-inch diesel engine in western Missouri, and in Arkansas, Oklahoma, New Mexico, Kansas, Colorado, Iowa, Nebraska, Minnesota, and North and South Dakota.

Represents Marion in Minnesota

Ruffridge-Johnson Equipment Co., 250 10th Ave., S., Minneapolis, now distributes the Marion Power Shovel Co. line in the entire state of Minnesota. The mining companies on the iron range are excluded from this contract. The Marion account brings the number of major industrial manufacturers represented by Ruffridge-Johnson to 13.

Territories Open for Power Puller

A few distributorships are still open for the More Power puller, which can be used for pulling pipe, stretching cable and wire fences, moving machinery, loading trucks and trailers, etc. If you are interested, get in touch with the manufacturer, The Wyeth-Scott Co., on Sisal St., Newark, Ohio.

William Crawford of Pa. Dies

William Crawford, President of Equipment & Supply Co., Heil distributor for many years at Pittsburgh, Pa., died suddenly of a heart attack on June 26.

He was a leading figure in the construction-equipment field and an authority on pile driving. He was President of the Western Pennsylvania Contractors Association and served in many capacities for national and regional organizations.

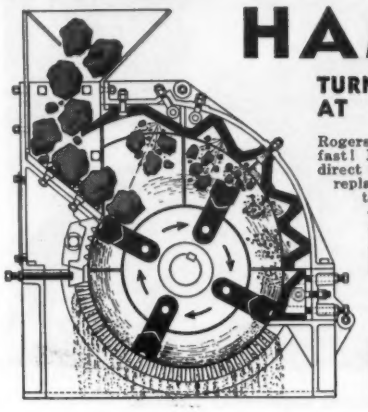
Dealers—this is your department, so send us your news—new plants, new lines, new staff appointments.

ROGERS

HIGH CAPACITY EQUIPMENT FOR LOW COST ROCK REDUCTION

Double Shattering

HAMMERMILL



TURNS OUT AGRICULTURAL LIME AT 1600 R.P.M. WITHOUT A GRATE

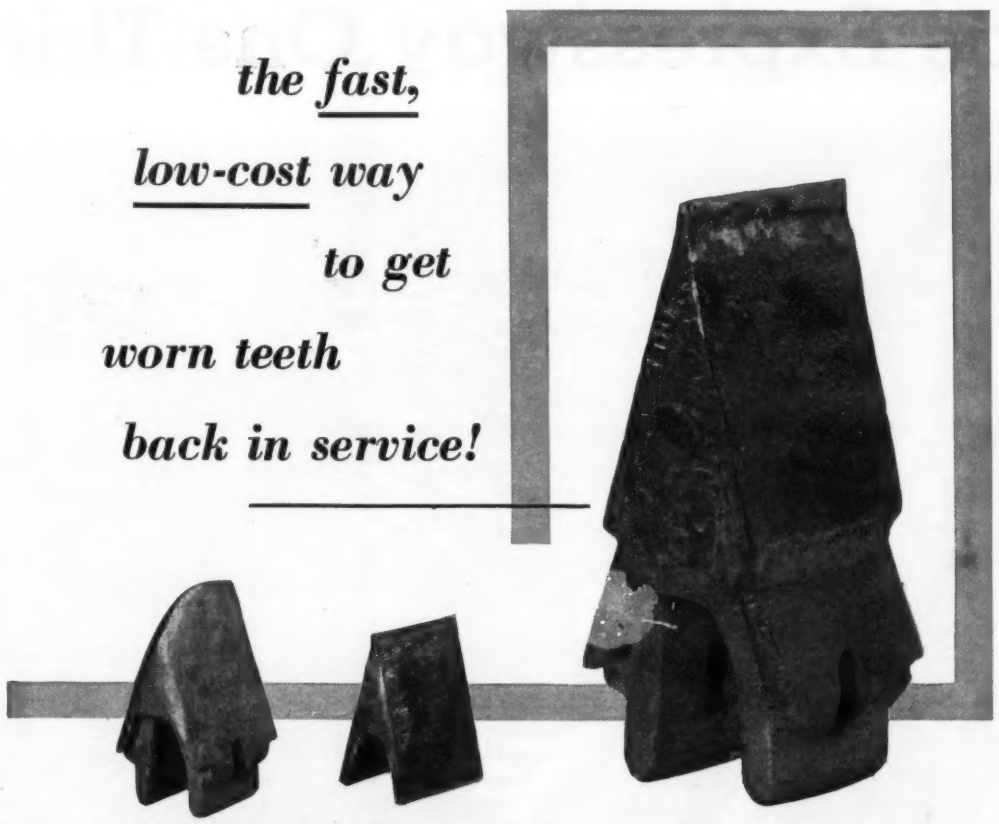
Rogers "Double Shattering" Hammermills turn out ag-lime fast! Hammers throw rock against fixed breaker plates at a direct 90° angle, giving maximum shattering impact. Easily replaced breaker sections and hammers keep maintenance costs down. Rogers Hammermills produce high quality road rock at speeds of 800 to 1200 R.P.M. For better rock products and lowered production costs use Rogers equipment.

Write for free booklet on Rogers Hammermills

ROGERS IRON WORKS CO.

JOPLIN, MISSOURI

the fast, low-cost way to get worn teeth back in service!



1. Worn tooth . . . 2. Plus AMSCO Tooth Repointer . . . 3. Equals like-new tooth—ready for service!

AMSCO® tooth repointers

AMSCO Repointer Bars

3 teeth partially rebuilt with AMSCO Repointer Bars to show sectional view of welding method. These Repointer, or Wedge Bars, are also made in many shapes and sizes. Apply AMSCO Economy Hardface to the rebuilt tooth *—for as much as 3 times longer service!*

● Here's a typical example of a badly worn dipper tooth completely restored to service . . . simply by welding on the AMSCO Cast-To-Size Tooth Repointer. The result is like-new service life and efficiency, plus a long-wearing tooth of Manganese Steel—the steel that actually work-hardens in service. Cost? *Far less than replacement!*

Wherever equipment has teeth that wear, more and more owners are using money-saving AMSCO Tooth Repointers . . . available in a wide variety of styles and sizes.

Get all the facts! Write today for Bulletin W-10-A —showing complete instructions for use.

put LIFE into service with

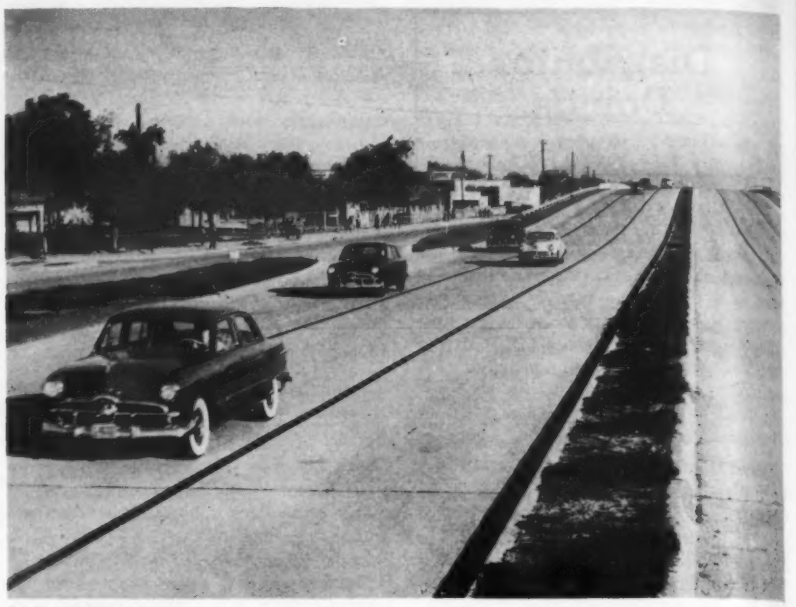
AMSCO® WELDING PRODUCTS

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

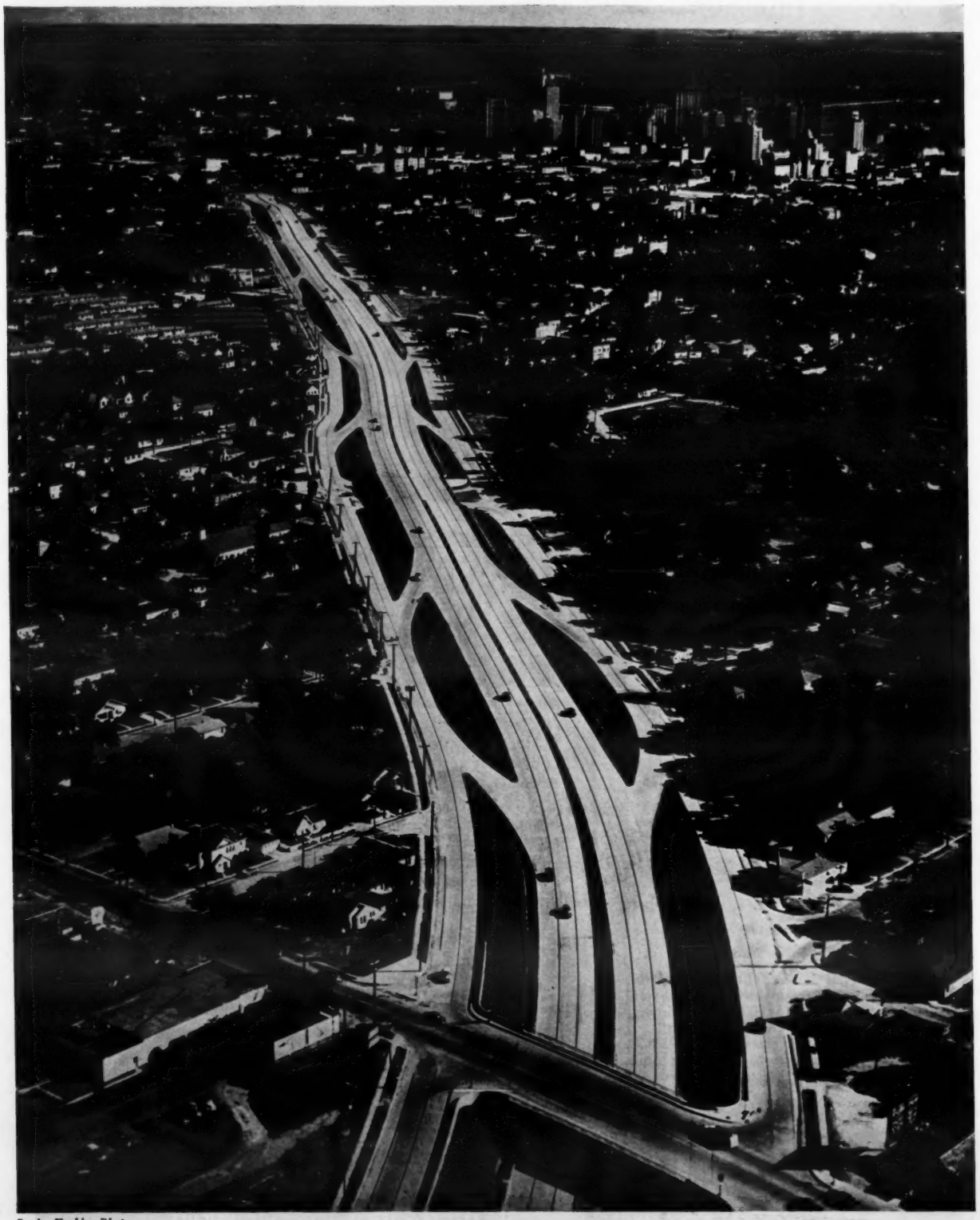
395 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Texas Highway Department Photo
January, 1947: a view along the Central Expressway location.



Squire Haskins Photo
November, 1949: two years later, a completed section of Central Expressway.

Dallas Expressway One-Third Finished



Squire Haskins Photo
Here it is from the air, the Central Expressway, which will ease bumper-to-bumper traffic jams in Dallas.

City Solves Traffic Jam by Wrecking Old Railroad and Building 11-Mile Expressway On Right-of-Way

By RAYMOND P. DAY,
Western Editor

✦ DALLAS, Texas, has dedicated the first section of a unique expressway. Located in 1872, partly by accident, the Central Expressway lay dormant for three quarters of a century.

Its site is the right-of-way of the old Houston & Texas Central Railroad. It runs through the middle of an area that has since become a modern city with typical city traffic problems. The right-of-way of the railroad bisects the city for 11 miles in a general north-south direction.

Including right-of-way, construction costs will total $21,500,000. Other money has now been earmarked for construction of realigned major highways, such as U. S. 67 and U. S. 80 which pass through Dallas. By the end of 1950, an impressive portion of these auxiliary roads will be under contract. All but 2½ of the 11-mile Central Expressway will then be finished, or under contract. The City of Dallas is making excellent progress with the construction and reconstruction of feeder roads under its agreements with the Texas Highway Department and the Bureau of Public Roads.

Expressway History

While present construction owes its success to the cooperation of many engineers, it was first visualized in 1911. It was then that the first suggestion was made that the right-of-way of Houston & Texas Central Railroad through Dallas be purchased, the tracks removed, and a motor thoroughfare be built. It was to be known as Central Avenue. This recommendation was made by City Planner George E. Kessler to the Board of Commissioners and the Park Board of the City of Dallas.

During the administration of Mayor W. M. Holland in 1927, the Ulrickson Committee report gave "Central Avenue" the No. 1 spot in its list of recommended projects.

On October 8, 1937, the Texas State Highway Commission passed a minute which ordered the State Highway Engineer to make location surveys and prepare right-of-way maps and deeds for the "Proposed Central Boulevard". The necessary appropriations were made for

(*Continued on next page*)

the work, and it was completed the following year.

In 1939 W. J. Powell, Consulting Engineer, prepared for the city of Dallas a "Plan of Development and Estimate of Cost" for the Central Boulevard Project. Mr. Powell completed his work in 1941. On January 26, 1943, the City of Dallas and the Texas Highway Department entered into a contract for the construction of the project.

The first contract for preliminary engineering was awarded on May 1, 1944, to J. G. Rollins, Consulting Engineer, by the Texas Highway Department. This contract provided for the preparation of plans, specifications, and estimate of cost for construction. Work was completed in July, 1945. The following September the State Highway Engineer was authorized to organize an engineering force to be made responsible for all future urban-expressway engineering work in Dallas. T. E. Huffman, District Engineer for the Texas Highway Department, was appointed Engineer-Manager, and an engineering force was organized. The new organization took over its duties in October of that year.

Engineering Problems

Most observers agree that traffic congestion is pinching Dallas just a little tighter than any other city of the southwest.

The narrow streets and alleyless blocks of the business district are full of vehicles creeping bumper-to-bumper during every rush hour. Use of the best known traffic-control devices and inauguration of one-way streets has helped, but these expedients are approaching the limit of their effectiveness. The traffic continues to grow with population. An acute downtown parking shortage adds to the problem.

Converging on the business district are vehicles from the suburbs, and through motorists who often choose to drive through Dallas rather than skirt the city on the loop drives. The problem has long threatened the pattern of city development which centers in towering skyscrapers.

Impetus for construction was given by the 1944 Federal-Aid Highway Act, which for the first time recognized urgency in the public interest of aiding cities to finance adequate thoroughfares over which Federal highways were routed.

Financing

State, Federal, county, and city funds for completion of the expressway are being provided under an agreement whereby (1) the City of Dallas and the City of University Park furnish all right-of-way within their respective areas; (2) Dallas County furnishes all right-of-way outside the city limits of Dallas; (3) construction of a 1.95-mile downtown section is the responsibility of Dallas, with the State paying half the construction cost; (4) the Federal government and the Texas Highway Department share equally in the planning and construction cost of the entire job, except for the downtown section.

Modern Design

The north 3.61-mile section of the expressway will have 10 lanes for traffic; a 3-lane freeway in each direction divided by a mall or parkway. Ten-foot-width paved emergency parking shoulders, with mountable curbs from the freeway pavement, are provided. In addition, the frontage or service streets on each side of the freeway will be 32 feet wide; two 12-foot traffic lanes and one 8-foot parallel parking lane.

The frontage streets will be operated as one-way thoroughfares. They will be separated from the freeway by an 11 to 28-foot-width grassed parkway. The expressway is designed for a speed of 50 miles an hour. The south section, 3.18 miles long, is similar except that the freeway will include 4 instead of 6 lanes.

Through the downtown area between Park Row and Bryan Streets, a distance of 1.95 miles, three existing streets are being widened and converted into thoroughfares over which the expressway traffic will be routed. These three streets, Pearl, Preston, and Latimer, will serve as collection and dispersal avenues for entering and leaving the north and south sections of the expressway. The contract between the City and State provides that when the traffic increases in sufficient volume to justify the improvement, an overhead expressway will be built through the downtown area between Latimer and Preston Streets. The three thoroughfares will then function as service streets along the elevated expressway.

When the expressway is completed, it will save 1.3 miles in the distance required to travel across Dallas. It will cut down the travel time by more than 22 minutes. Basing current vehicle operating costs at 1½ cents per minute for automobiles and 4 cents for commercial vehicles, the saving in operating cost alone will liquidate the original investment in less than 20 years.

Unusual Drainage Problem

A peculiar drainage condition had to be solved in designing the new expressway. Torrential rains have frequently closed certain Dallas streets in years gone by. They happen infrequently, but once every five years, on an average, the rainfall intensity is at the rate of 6.7 inches per hour for a period of 5 minutes. The expressway had to be designed so that it would never be closed by such rains.

In consequence, a storm-sewer tunnel 11,400 feet long was installed under a portion of the north expressway. Horseshoe shaped, it is 12 feet wide at floor level and 9 feet 7 inches high in the

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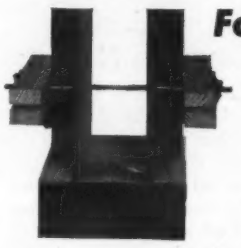

For better alignment in your footings, use WILLIAMS FORM ALIGNERS

$9.75 PER 100 (8" WALL)

Write for circular, "Suggestions for Using WILLIAMS Form Clamps and Their Accessories"

WILLIAMS FORM ENGINEERING CORP.
Madison Ave. & Garden St. GRAND RAPIDS, MICHIGAN

Engineers Confirm in the Field the Strength and Accuracy Technical Editors Found in Gurley Aluminum Alloy Transits

Gurley Instruments
An article describing the advantages of aluminum construction of Gurley instruments where accuracy, strength, lightness and freedom from vibration are essential.
Aluminum Used Successfully in Precision Instruments
A PICTORIAL STORY
Requirements of accuracy during a long service life are controlling factors in selection of materials for engineering and surveying instruments.
Combining durability and lightness with precision for surveying transits
by David W. Veit
Editor, Der Gasmaga Magazine

FROM AN EXPLORER:
"Have been using your instruments since 1906, which I purchased for surveys in Mexico—and they are as good as ever."

FROM AN ENGINEER SOMEWHERE IN EUROPE:
"Your instruments can take it. I have been using a Gurley Transit here in Europe for the past year under the roughest kind of treatment and it is still in perfect adjustment."

FROM A COMBAT ENGINEER IN WORLD WAR II:
"I spent three years overseas as chief of a survey party. We were required to do very accurate work. We used Gurley 20-second transits and after being dropped and about everything else, they still did work up to par."

From the first model
—built in 1876 and retired after 50 years of service—Gurley Aluminum Alloy Transits have met every field requirement for strength, lightness, freedom from vibration and permanent accuracy—in heat, cold and the roughest treatment. For complete details about Gurley instruments, write for your free copy of Catalog 50.

GURLEY
Surveying and Scientific Instrument Makers
Since 1845

W. & L. E. GURLEY, FULTON & STATION STS., TROY, N. Y.
Surveying and Engineering Instruments, Hydraulic Engineering Instruments, Standard Precision Weights and Measures, Paper and Textile Testing Instruments, Reticle Making Facilities, Aeronautical Navigating Instruments and Meteorological Instruments.

Dallas Expressway One-Third Finished

(*Continued from preceding page*)

center. It penetrates a solid rock formation 50 feet below the surface. Scuppers from the pavement above train the water down to the tunnel.

McKenzie Construction Co. built the storm-sewer tunnel, and the grading, base, and paving work for the first part which is now complete was divided among Austin Bridge Co., Austin Road Co., and Texas Bitulithic Co.

Overpasses

One of the most outstanding features of the new improvement is the overpasses which carry intersecting traffic over the expressway. Designed by D. A. Nettleton, formerly with the Pennsylvania Turnpike Commission and the Port of New York Authority, the concrete overpasses are simple and beautiful.

Designed for H20 S16 loading, they are rigid-frame structures with foundations set on solid rock. Expansion joints separate the wing walls from the structure, thus allowing expansion by compression of the backfill.

Personnel

The names of men who worked together to make Dallas' dream a reality are many. For the Texas Highway Department, D. C. Greer is State Highway Engineer. T. E. Huffman was Engineer-Manager until he resigned recently to become Highway Manager of the Dallas Chamber of Commerce; R. E. Killmer has succeeded him. J. A. Elliott was Division Engineer for the Bureau of Public Roads, with J. M. Page as District Engineer. City engineering was under the supervision of J. T. Conroy, Director of Public Works, and R. H. Clinger is County Engineer.

One example of the size of the undertaking was right-of-way acquisition. There were 367 houses and other buildings, representing that many pieces of property. Only three had to go through condemnation proceedings.

Bucket-Type Car Unloader

A 4-page illustrated folder on the Markroy bucket-type elevator for unloading cars is offered by the Markroy Co., 6th and McCambridge, Madison, Ill. Designed for handling gravel, stone, sand, cement, etc., this unit has a stockpiling capacity of 1½ to 2 tons per minute, according to the literature. It is fully portable—the feeder and elevator can be disassembled and a small pick-up truck can transport the unloader from job to job.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 24.

A New Transmission For Low-Hp Engines

A new Varimatic transmission for Husky 3.0 to 4.5-hp and 5.2-hp air-cooled engines has been announced by Cushman Motor Works, Inc., Lincoln, Nebr. It is designed to provide, through the use of an automatic clutch, a smooth throttle-controlled speed change varying between a 3 to 1 reduction in low to a 0.95 to 1 overdrive in high.

It consists of two main units: the drive member, which includes the clutch mounted on the engine crankshaft; and a V-belt drive to the driven member mounted on a jackshaft or on a sliding-gear transmission for an additional low speed of 2.25 to 1 and reverse. The two units are balanced to function together with the belt tension controlled by the action of springs on a cam surface in the driven member. This power unit is designed for use in material-handling equipment and vehicles where simple operation with smooth power engagement is necessary.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 155.

The Daniel Construction Co., of Greenville, S. C., has completed the steel work and half-finished the brick work on the Calhoun Towers Apartment in Greenville. This 14-story $1,800,000 building will have 745 rooms, providing homes for 200 families. It was designed by the architectural firm of William G. Lyles, Bissett, Carlisle, & Wolff, of Columbia, S. C.

the new Detectron
PIPE LOCATOR
"The Greatest Improvement in Years"
MODEL 505
Consider these Features:
Matchless Performance
Unequalled Circuit
Shielded Loops
Metal Case—Modern, Smart
Greater Depth—Simpler Control
Greater Sensitivity
Light Weight—Easily handled
All these and many more at a
NEW LOW PRICE
THE ONLY PIPE LOCATOR WITH THE
LIFETIME GUARANTEE
For information write to Dept. 8-L
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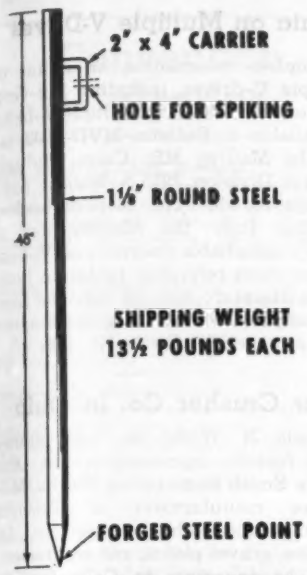
PLASTILUBE
THE SUCCESSOR TO GREASE
In 4 short months, over 900 cost-and-quality-minded firms have bought and now specify PLASTILUBE, the successor to grease (compounded with Warren's I-45 and BENTONE, a product of National Lead Co.)
★ NEVER MELTS
★ MULTI-PURPOSE
★ COSTS LESS IN USE
You can't afford NOT to use PLASTILUBE... place your order or write for full details today!
Our 50th Anniversary Year
THE Warren REFINING & CHEMICAL COMPANY
CLEVELAND 15, OHIO

FOSTER's Piling Rental Service
STARTS JOB MONTHS in ADVANCE of *CONTRACTORS PLANS
* A joint venture of the Western Foundation Corp. and Spencer, White & Prentis, Inc. and executed under the general direction of The Stone & Webster Engineering Corp.
"This is the first time a circular steel sheet piling cofferdam, supported by a reinforced concrete wale, has been used in this country...and FOSTER PILING RENTAL SERVICE enabled this job to begin months in advance."
WESTERN FOUNDATION CORPORATION and SPENCER, WHITE & PRENTIS, Inc., (N.Y.,N.Y.)
Foster shipped 500 tons of interlocking steel sheet piling immediately upon receipt of the order for this cofferdam, for the construction of a water intake for a power plant of the Union Electric Light & Power Co., Venice, Illinois. From Foster's complete warehouse stocks, exact correct lengths and sections were selected and arrived on the job long ahead of schedule.
FASTER FROM FOSTER
Foster's Piling Rental Service can save you time and money . . . giving you the head start that means extra economy and extra profit! No deposit is required and Foster's rental rates give you a low fixed expense as an added competitive advantage when bidding on jobs. Whatever your needs you can count on the exact length and section the job requires—on all your piling needs "FASTER FROM FOSTER."
Send for New Free Piling Reference Wall Chart CE-5
STEEL PILING • PIPE & PIPE FABRICATION • RAILS • TRACK ACCESSORIES • WIRE ROPE
L. B. FOSTER CO.
PITTSBURGH 30, PA. CHICAGO 4, ILL. NEW YORK 7, N.Y. HOUSTON 2, TEX.



The Saber Stake is a new type of steel form stake which has been introduced by Rockford Bolt & Steel Co.

A Steel Form Stake

A new type of form stake has been developed by Rockford Bolt & Steel Co. of Rockford, Ill. The Saber Stake, as it is called, is made of 1⅛-inch round steel 48 inches long and has a forged steel point. The 2 x 4-inch carrier near the top of the stake has a hole in the handle so a 2 x 4 can be spiked into a firm position.

The manufacturer claims that Saber Stakes can be driven into rocky or frozen ground, macadam or black-top paving, to any desired height, to make a quick temporary barricade. Any length of 2 x 4 can be used. The new stake may also be used for dropping plumb, or setting door and window frames.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 69.

Concrete-Cutting Machines

An 8-page booklet on concrete cutting and removal with Di-Met segmented diamond abrasive wheels can be secured from the Felker Mfg. Co., Torrance, Calif. The equipment featured in the literature is the Felker concrete-cutting machine; a completely mobile unit incorporating its own gasoline power supply, with an integral water tank for blade cooling and special mechanisms for lowering the blades smoothly into the work.

The folder describes the application for these machines on highways and streets, and in factories and industrial buildings. Detailed operational methods and costs are included. A number of photographs show how the machine works and what results can be obtained with it.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 91.

Gar Wood Buys Company

Through a new subsidiary, Gar Wood Industries, Inc., now makes equipment for trucks of one ton and under, as well as for larger trucks. The company has purchased National Truck Equipment Co., of Waukesha, Wis., and will operate it through a newly formed subsidiary to be known as the National Lift. Co. Products added by this purchase are the Dump-O-Matic twin hydraulic hoist for ½, ¾, and 1-ton trucks; the Hydra-Clutch pump; and the Jumbo twin hydraulic hoist for 1½ and 2-ton trucks. They will continue to be manufactured in the former National Truck Equipment plant at Waukesha.

Air-Entrained-Concrete Body

A 4-page folder describing the Hi-N-Lo air-entrained-concrete body has been prepared by the Daybrook Hydraulic Corp., Bowling Green, Ohio. Designed to carry 3 cubic yards of concrete, the body can discharge at any point from 6 inches from the ground to 7 feet 6 inches. All construction and operation features are fully discussed and illustrated in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 30.

"BICKNELL BETTER BUILT"

PAVING BREAKER TOOLS

We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

BICKNELL MANUFACTURING CO.

12 LIME STREET ROCKLAND, MAINE

VAN DORN POWER helps you Hammer *Loose* Tight Fastenings!

Van Dorn ⅝" Electric Impact Wrench is a handy tool for hammering stubborn fastenings loose or driving them home, in a few seconds—whether you use it for equipment maintenance or construction work! Delivers 2000 blows per minute. Handles nuts, bolts, cap screws. Weighs only 8½ lbs. ½" square drive shank, perfectly balanced and easy to control. See your Van Dorn Distributor. Write for free catalog to: THE VAN DORN ELECTRIC TOOL CO., 787 Joppa Road, Towson 4, Md.

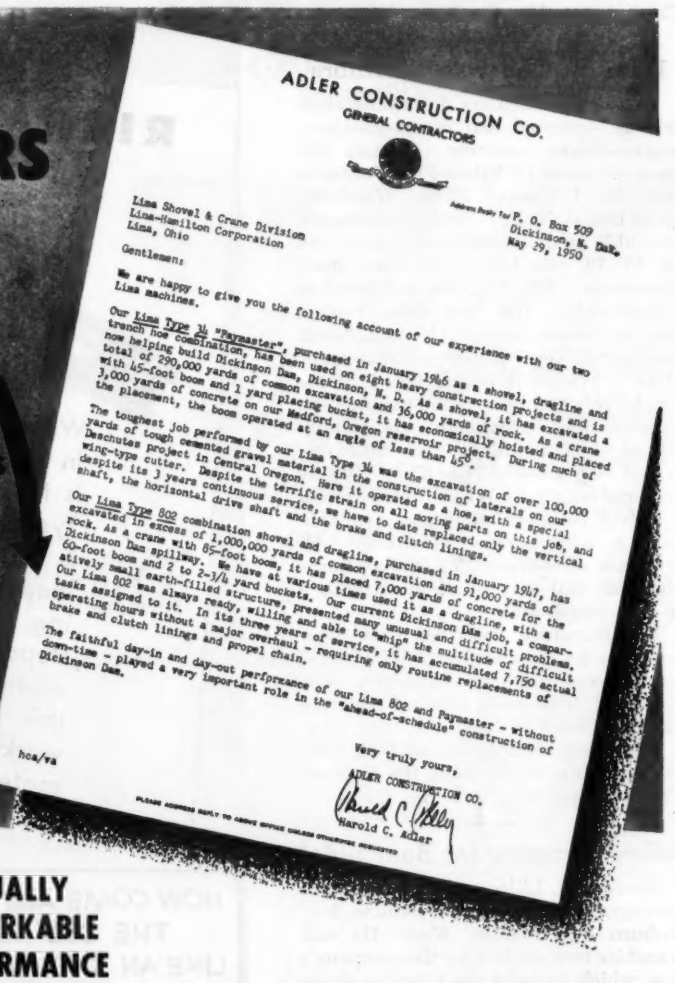
FOR POWER SPECIFY "Van Dorn" PORTABLE ELECTRIC TOOLS

(DIV. OF BLACK & DECKER MFG. CO.)

"7750 ACTUAL OPERATING HOURS WITHOUT A MAJOR OVERHAUL!"

That's Adler Construction Company's Experience with a

LIMA TYPE 802



ADLER CONSTRUCTION CO.
GENERAL CONTRACTORS

Address Reply to: P. O. Box 509
Dickinson, N. Dak.
May 29, 1950

Lima Shovel & Crane Division
Lima-Hamilton Corporation
Lima, Ohio

Gentlemen:

We are happy to give you the following account of our experience with our two Lima machines.

Our Lima Type ¾ "Paymaster", purchased in January 1946 as a shovel, dragline and trench hoe combination, has been used on eight heavy construction projects and is now helping build Dickinson Dam, Dickinson, N. D. As a shovel, it has excavated a total of 290,000 yards of common excavation and 36,000 yards of rock. As a crane with 45-foot boom and 1 yard placing bucket, it has economically hoisted and placed 3,000 yards of concrete on our Medford, Oregon reservoir project. During much of the placement, the boom operated at an angle of less than 45°.

The toughest job performed by our Lima Type ¾ was the excavation of over 100,000 yards of tough cemented gravel material in the construction of laterals on our Deschutes project in Central Oregon. Here it operated as a hoe, with a special wing-type cutter. Despite the terrific strain on all moving parts on this job, and despite its 3 years continuous service, we have to date replaced only the vertical shaft, the horizontal drive shaft and the brake and clutch linings.

Our Lima Type 802 combination shovel and dragline, purchased in January 1947, has excavated in excess of 1,000,000 yards of common excavation and 91,000 yards of rock. As a crane with 85-foot boom, it has placed 7,000 yards of concrete for the Dickinson Dam spillway. We have at various times used it as a dragline, with a 60-foot boom and 2 to 2-½ yard buckets. Our current Dickinson Dam job, with a relatively small earth-filled structure, presented many unusual and difficult problems. Our Lima 802 was always ready, willing and able to "whip" the multitude of difficult tasks assigned to it. In its three years of service, it has accumulated 7,750 actual operating hours without a major overhaul - requiring only routine replacements of brake and clutch linings and propel chain.

The faithful day-in and day-out performance of our Lima 802 and Paymaster - without down-time - played a very important role in the "ahead-of-schedule" construction of Dickinson Dam.

Very truly yours,
ADLER CONSTRUCTION CO.
Harold C. Adler

hca/va

PLEASE ADDRESS REPLY TO ABOVE OFFICE UNLESS OTHERWISE INDICATED

EQUALLY REMARKABLE PERFORMANCE IS REPORTED FOR A LIMA TYPE 34 PAYMASTER

This company's outstanding record in completing jobs ahead of schedule has been the subject of several feature articles appearing recently in construction magazines. In these articles, as well as in the accompanying letter, Adler gives his LIMA machines credit for playing a major role in these achievements.

Here is another case showing why it will pay you to consult a LIMA representative before you purchase your next shovel, crane or dragline. The LIMA line includes Shovels ¾ to 6 yards, Cranes to 110 tons and Draglines variable. Truck-mounted cranes in 20 and 35 ton capacities.

Offices in principal cities of the world.

Lima Shovel and Crane Division

LIMA, OHIO

OTHER DIVISIONS: *Lima Locomotive Works Division; Niles Tool Works Co.; Hooven, Owens, Rentschler Co.*

LIMA HAMILTON CORPORATION

Torque-Flow Power On Locomotive Crane

The Torqflo drive on the new line of diesel locomotive cranes now being produced by Browning Crane & Shovel Co., 16226 Waterloo Road, N. E., Cleveland 10, Ohio, is designed to provide effortless, smooth, fast operation to the travel, swing, hoist, and boom-hoist mechanisms. The torque-converter hydraulically absorbs any increases in loads and thereby saves wear on cables, clutches, brakes, and gear train, Browning says.

Sensitive metered air controls permit fractional power applications to the hoist, swing, or travel—independently or simultaneously. The new MLC series offers three models: 25-ton, 30 to 40-ton, and 35 to 50-ton capacities. The units feature anti-friction bearings, full-vision cab, one-piece cast-steel rotating base, all-welded car body, non-slip steel operator's platform, and extra-heavy truck bolster springs. A 55-foot boom is standard on all models.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 110.

Torque-converter power is applied to all functions of the new Browning Series MLC locomotive cranes by metered air controls.

Data on Multiple V-Drives

Complete information on a line of multiple V-drives, including Ful-Grip sheaves and Mor-Grip multiple V-belts, is available in Bulletin MVD-1000, issued by Maurey Mfg. Corp., Multiple V-Drive Division, 2915 S. Wabash Ave., Chicago 16, Ill. The 16-page booklet describes fully the Maurey line of quickly detachable sheaves and V-belts and provides reference tables on both.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 116.

For Crusher Co. in Ohio

Arnold N. Wigle has been named direct factory representative in Ohio by The Smith Engineering Works, Milwaukee manufacturer of Telsmith crushing and other equipment for quarries, gravel plants, and contractors. From headquarters in Columbus, he will cover all of Ohio except the Cincinnati territory.

Data on Concrete Vibrators

A series of circulars describing electrically operated and direct-gasoline-engine-driven concrete vibrators has been prepared by Vibro-Plus Products, Inc., 54-11 Queens Blvd., Woodside, Long Island, N. Y. These vibrators are available in four standard types: the 45, 55, 70, and 100, which have head diameters of 1¾, 2 3/16, 2¾, and 4 inches respectively. The first three models may be powered with 110 to 220-volt single or three-phase electric motors, or either a Wisconsin or a Briggs & Stratton 4-cycle gasoline engine mounted on a swivel base. A wheelbarrow mounting is available for the gasoline operated vibrators. The Type 100 is powered by a 5-hp Wisconsin engine on a swivel base, which is also available with a wheelbarrow mounting. All units are provided with a 20-foot flexible shaft, but may be obtained with a 30-foot length also.

The literature describes each type and lists its specifications, dimensions, weight, and price. It illustrates each type and tells what kind of concrete vibration work it does best.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 121.

Sales Manager for Baer Steel

Manford R. Lillengreen is now Sales Manager for Baer Steel Products, Inc., Auburn and Renton, Wash. He will franchise new dealers for the company's line, which includes the Fibraloy dragline, shovel, hoe buckets and accessories for excavating buckets.

DIG HOLES FAST

The Danuser Digger digs holes fast, straight and automatic—500 to 600 per day. Easily fitted to most popular tractor makes—built for rough, rugged jobs. One man operation; augers 4" to 24". Write Dept. D.

DANUSER MACHINE CO. Fulton, Mo.

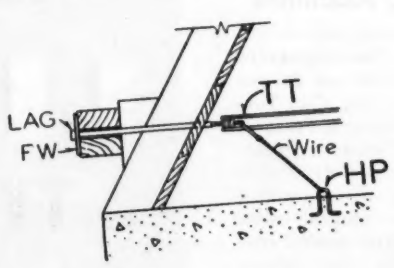
DANUSER DIGGER

Also Manufacturers of the Famous Danuser All-Purpose Blade

ENGINEERED TYING DEVICES, ANCHORAGES and ACCESSORIES for CONCRETE CONSTRUCTION

RICHMOND TIE DOWN TYSCRU

Wherever it is necessary to offset tendencies toward uplift in the form, such as on battered walls, this Richmond Tyscru is the simple and efficient answer. It is a standard 2-strut Tyscru with a 45° Tie Down Loop at one or both ends. The loop is wired to a Hairpin or Ty-loop imbedded in the footing. Richmond's Technical Department will gladly demonstrate the advantages of this device by preparing working drawings and estimates on your next job.



HOW COME ALL OF A SUDDEN THE OLD MAN TALKS LIKE AN ENGINEER ABOUT BUILDING FORMS?
WELL- HE'S USED RICHMOND KNOW-HOW SUCCESSFULLY SO LONG THAT IT'S PART OF HIM. NOW, WE CAN DO THIS JOB WHILE HE PLANS THE NEXT OPERATION.
INSIST ON RICHMOND
...AND BE SURE IT'S RICHMOND!
Richmond
SCREW ANCHOR CO., INC.
816-838 LIBERTY AVENUE · BROOKLYN 8, N.Y.

RICHMOND KNOW-HOW—DEPENDABILITY—SERVICE—ESTIMATES & JOB PLANNING

Convention Calendar

September 11-13—AGC Meeting
Midyear Meeting, Associated General Contractors of America, Lookout Mountain Hotel, Chattanooga, Tenn. H. E. Foreman, Managing Director, Munsey Bldg., Washington 4, D. C.

October 11-14—ASCE Meeting
Fall Meeting, American Society of Civil Engineers, Congress Hotel, Chicago, Ill. Don P. Reynolds, Assistant to the Secretary, 33 W. 39th St., New York 18, N. Y.

October 16-20—Safety Congress
National Safety Congress and Exposition, National Safety Council, Stevens, Congress, Morrison, and LaSalle Hotels, Chicago, Ill. R. L. Forney, General Secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

November 12-30—Brazil Road Show
Road Show, Brazil National Highway Department and Associacao Rodoviaria do Brasil, Rio de Janeiro, Brazil. Ing. Jose Maria Carre, Delegado Executivo, Associacao Rodoviaria do Brasil, Caixa Postal 4351, Rio de Janeiro, Brazil.

Dec. 10-17—Pan American Highway Congress
Fifth Pan American Highway Congress, Lima, Peru. International Road Federation, 550 Washington Bldg., Washington 5, D. C.

Jan. 9-12, 1951—Highway Research Board
Annual Meeting, Highway Research Board of the National Research Council, National Academy of Sciences Bldg., Washington, D. C. Roy W. Crum, Director, 2101 Constitution Ave., Washington 25, D. C.

March 12-14, 1951—ARBA Meeting
Annual Meeting, American Road Builders' Association, Shroeder Hotel, Milwaukee, Wis. Lt. Gen. Eugene Reybold, Executive Vice President, International Bldg., Washington 4, D. C.

American Builders Praised by Britons

The Productivity Team from the British Building Industry, which visited the United States last year, has issued a unanimous report containing proposals for increasing British building. The team, headed by Robert Owen Lloyd, general contractor, included representatives of management and labor, leading architects, and quantity surveyors. Its 6-week tour ranged from Boston to Washington and as far west as Chicago. The tour was sponsored jointly by the Anglo-American Council on Productivity and the Economic Cooperation Administration. The Building Trades Employers Association of New York City cooperated with these agencies.

The report — taking a long view — states that more is to be learned from the general spirit and outlook of the American industry than from details of organization and technique. No major discoveries which could conceivably revolutionize British building practice in a short time were made, although, the report states, there are many points in American methods of construction which, if adopted, would raise the efficiency of the British industry.

Members of the team were impressed by a spirit of initiative and cooperation which seemed to them to animate all sections of industry. A general belief in the need for experiment and progress, direct material incentives to self-advancement, and the penalties for failure to keep abreast of the times accounted, they thought, for the speed and efficiency of construction. They mention, as an example, the erection of the framework and floors of two stories of a skyscraper block in one week.

The report noted that at the old exchange rate building costs in the U. S. averaged about 80 per cent more than in Britain. The average hourly wage in the U. S. was put at slightly more than four times the British average. (The argument that the high wage rates in the U. S. are made necessary by the high cost of living is described as an overstatement.) From a comparison of work on various site operations, the team concluded that the output per man-hour is about 50 per cent higher in America than it is in Britain. This, they said, was due to the greater speed at which the operatives work, the ready supply of materials to craftsmen, and the existence of a supply of unemployed workers.

The cost of public housing in the U. S. represents a far smaller proportion of the national budget than in Britain. Although public funds are being drawn upon for the proper housing of the poorer classes, private builders in the U. S. claim that they can meet the needs of 55 per cent of the population. In contrasting the American and British outlooks, the report says that the heavy subsidization of building in Britain, however necessary it may be, diminishes the incentive to secure lower costs.

The report concluded with specific recommendations to the British building industry: adequate planning before designs are submitted to contractors for bidding; adequate organization of the job before construction begins — "[In America] it would be unthinkable for a contractor to be instructed to send half a dozen laborers to start excavation at a time when the final designs were no more than half sketched . . . merely to satisfy the owner's desire to see work in progress."; adequate supplies of timber at a reasonable price; examination of the whole question of quality-controlled concrete; constant review by Government departments of the possibility of relaxing or eliminating controls; more energy-giving foods for workers; and propaganda to inculcate safety-mindedness.

Electric-Motor Booklet

A new bulletin, No. EM4-812, on polyphase electric motors has been issued by the A. O. Smith Corp., Motor Division, Los Angeles 22, Calif. It describes a line of horizontal motors with capacities of 1 to 75 hp, illustrating construction details in cross-section and cutaway views. Among the features described are motor appearance, insulation, bearings, ventilation, mounting, service, frames and end bells, terminal box, rotors, and machining.

This literature may be obtained from the company. Or use the Request Card at page 16. Circle No. 27.

15

LaPLANT CHOATE MOTOR SCRAPERS START NEW JERSEY TURNPIKE

10 for VILLA CONTRACTING
ON CONTRACT 10—RARITAN RIVER TO WOODBRIDGE

5 for GRANDVIEW CONSTRUCTION
ON CONTRACT 9—ALLENTOWN TO RARITAN RIVER

FIRST CHOICE ON MORE AND MORE JOBS EACH DAY

LaPlant-Choate TS-300 Motor Scrapers have the enviable reputation of being *first choice* on more and more jobs each day. BIG . . . RUGGED . . . DEPENDABLE, they consistently deliver the goods.

There are *reasons* why! Whether your job calls for one unit or a dozen, it will pay you to investigate the profit-making ability of the Motor Scraper. Contact your LPC distributor—have him explain the Motor Scraper features and show you the machines in action. Better yet—talk to the men who own and operate them! **LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa • LaPlant-Choate Sales and Service, 1022 77th Ave., Oakland, Calif.**

LAPLANT CHOATE

Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.

Hydraulic and Cable-operated Dozers.

Gravel-Cement Base Shaves Runway Costs

Laid by Spreaders, Rolled, Then Topped With 2 Inches of Bituminous Concrete; Same Pugmill for Both Mixes

✦ COSTS were shaved in the construction of an airport runway at New Philadelphia, Ohio, last year with the use of lean rolled-mix concrete for a base course. The $167,932.50 contract, awarded to Edgar Spring, Inc., a local contractor, contained a bid price of $1.39 per square yard for the 6-inch cement-treated base, as compared to $1.73½ for the same depth of penetration macadam submitted in an alternate bid. On the 56,350-square-yard base item the savings approximated $19,500. The new type of base is topped with 2 inches of bituminous concrete.

The work at the Municipal Airport, on U. S. 250, 3 miles southeast of New Philadelphia, is a joint improvement, with the cost shared equally by the Civil Aeronautics Administration and the city, represented by the Board of Airport Commissioners. The airport was built in 1927 on a site with high-bearing sandy-gravel soil that provides excellent drainage. Turf served for runways.

This contract provides a single north-south paved runway, 3,950 feet long x 100 feet wide. Grading started in June, 1949, and by October the job was completed.

Subgrade and Base

Grading involved over 50,000 yards of excavation over a 300-foot strip running the length of the runway. Cuts and fills were under 3 feet. Dirt was moved by a couple of 12-yard scrapers pulled by International TD-18 tractors and leveled and shaped by a TD-9 dozer and a Galion motor grader. A compaction of 95 per cent was achieved with a sheepsfoot roller pulled by a Case tractor. There was a slight excess of material on the job.

Materials for the cement-treated base consisted of portland cement, bank-run gravel, and water. Cement was supplied by the Diamond Cement Co. of Middle Branch, Ohio, and hauled in bulk 40 miles by trailer truck to the Cummer 2½-ton pugmill asphalt plant of Edgar Spring, Inc., located 3 miles from the airport. Gravel was produced at the contractor's crusher with a top size of 1½ inches.

Two-ton batches were mixed 45 seconds in the pugmill. The cement content was 3¼ bags per cubic yard. The weights of a typical batch were as follows:

Cement	313 lbs.
Aggregate (dry)	3,442 lbs.
Water in aggregate	190 lbs.
Added water	55 lbs.
Total	4,000 lbs.

The total amount of water in a batch averaged 6½ per cent. Three sizes of local aggregate were used: fine unwashed sand, coarser washed sand, and gravel ranging in size from ⅜ to 1½ inches. The fine and coarse aggregate were proportioned by weight 60 and 40 per cent respectively. Their gradation follows:

Sieve Size	Per Cent Passing	
	Coarse Aggregate	Fine Aggregate
2-inch	100	....
1½-inch	95-100	....
¾-inch	40-100	....
No. 4	0-5	80-100
No. 16	....	45-80
No. 50	....	10-40
No. 100	....	5-25
No. 200	....	0-10

Laid by Spreaders

The mixed material was hauled the 3 miles to the airport by 6 trucks carrying 5 batches or 10 tons to a load. The material was dumped into the hoppers of two Apsco spreaders, operating in tandem in 10-foot lanes, which laid the gravel-cement mix without forms to a loose depth of 9 inches. The actual laying was always done within ½ hour of the time the mix left the pugmill. Wide-flange steel wheels were used on the spreader instead of large rubber-tire wheels to prevent the mix from pushing or shoving ahead. The single course was reduced to a compacted depth of 6 inches by rolling with a pair of Galion rollers—a 12-ton 3-wheeler, and an 8 to 10-ton tandem roller. Each machine made two passes over the freshly laid base course.

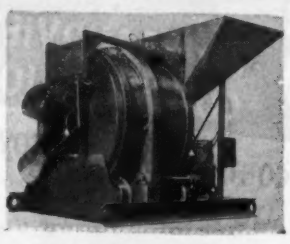
Rolling and the use of water were two important factors in the field operations. Care was exercised in doing the rolling at the best time, for there is not the same "give" with this type of base to guide the roller men as there is in a

(Continued on next page)

Portland Cement Association Photo
The cement, gravel, and water mix for runway base at New Philadelphia Airport is dumped into the hopper of an Apsco spreader, which will lay it to a loose depth of 9 inches. Edgar Spring, Inc., held the $167,932 contract for the project.

MONEY-MAKING

MIXERS

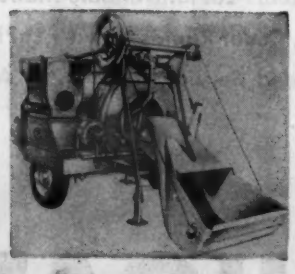


CMC 56-S TWO-YARDER

Specifically designed to facilitate increased Central Plant production on big jobs or in commercial plants. Advanced CMC engineering and features assure FASTER, SMOOTHER, and MORE EFFICIENT operation. Equipped with Timken Bearings throughout. Renewable hardened steel drum liners and hard alloy coated discharge buckets insure extra long life. Hydraulic finger-tip controlled charging and discharging.

CMC 11S and 16S FOUR WHEELERS

End or side discharge. Furnished in optional truck mountings. Compact construction for easy trailing and spotting on job. Timken roller bearing. Machined drum trucks. Improved stabilizers.



CMC 6-S TRAILER

HERE IS THE MOST VERSATILE MIXER ON WHEELS. Superior CMC design assures faster charging. This high-speed, non-tilt unit incorporates all the plus-value features that have made CMC mixers "tops in the field." Write today for latest illustrated catalog and prices

CONSTRUCTION MACHINERY COMPANIES WATERLOO, IOWA

PROVED

in every service

For ease of installation, for simplicity and economy of operation, for clarity of reception and freedom from adjacent channel interference, Raytheon Radiophone provides the finest in mobile and fixed station equipment.

RAYTHEON

FM MOBILE RADIOPHONE

NEW MODEL UM 30 MOBILE UNIT

- Available in both single and dual channel models covering the entire 152-174 mc. frequency range.
- Requires less space—easier to install.
- Lowest battery drain—no special batteries or generators required.
- Meets all new F.C.C. requirements including adjacent channel operation and modulation limiting (deviation control).
- Furnished complete with all accessories.

COMPLETE BASE STATION EQUIPMENT

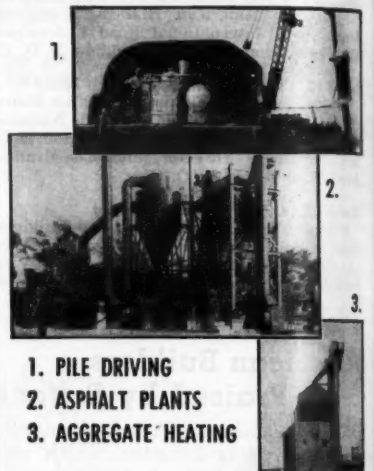
- Complete transmitting-receiving equipment for 30 or 60 watt base station systems.
- Designed throughout for maximum convenience, efficiency, ease of operation and simplified maintenance.

Model UB 60-1-LC control console (shown above) contains every desirable feature of a fixed station control unit. Equipment for wall or rack mounting also available.

Write for complete information—Address Dept. 6460CE

RAYTHEON MANUFACTURING COMPANY
WALTHAM 54, MASSACHUSETTS

Sold Exclusively in Canada by Canadian Marconi Co., Marconi Bldg., St. Sacrament St., Montreal
Export Sales and Service: Raytheon International, 50 Broadway, New York 4, N. Y.

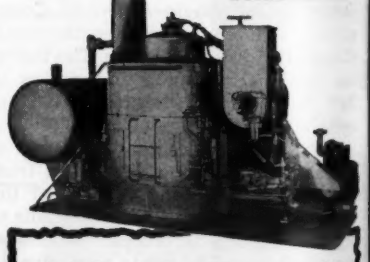


1. PILE DRIVING
2. ASPHALT PLANTS
3. AGGREGATE HEATING

LITTLEFORD

"Kwik-Steam"

GENERATORS



"Kwik-Steam" Generators are complete packages of steam, the fastest steam producing units ever offered to the Construction Industry. From a cold start the Littleford "Kwik-Steam" Generators will produce steam in 2 minutes time. Low cost in operation, these "Kwik-Steam" Generators save up to 50% on fuel. When started the automatic controls of the Generators take over and keep a predetermined steam pressure at all times. When steam is wanted, the burner automatically comes on; when steam is not needed, the burner cycles off. For heating aggregate at Ready Mixed Concrete Plants, Pile Driving, Heat for Asphalt Plants and Curing Concrete Blocks, are only a few of the many uses of the "Kwik-Steam" Generator, the fastest steam producer ever designed

LITTLEFORD BROS. INC.
485 E. Pearl Street, Cincinnati 2, Ohio

bituminous mix. And if the mix is rubbery under the roller from too much water, satisfactory compaction is attained only with difficulty. Yet it is essential not to let the water escape from the mix. To this end the subgrade was moistened before the mix was laid, and the surface of the base was also kept wet after the spreaders had passed. Two 1,500-gallon tank trucks with spraybars at the rear furnished the water. The unit wetting the base surface did so with a hand spray attached to a 1½-inch pump.

The base course was then quickly covered with an asphalt emulsion (0.2 gallon per square yard), also applied from a hand hose hooked to an Etnyre 1,000-gallon bituminous distributor. The base was sealed within an hour of being laid, the shot of asphalt emulsion serving as a curing agent and tack coat for the bituminous surface. Lane after lane followed in this manner until the runway base course was completed within a month's time. There are no expansion joints in this paving, and profile tolerances of ½ inch in 16 feet were followed by checking with a straight-edge.

The mixed material is non-plastic, of zero slump, and was quite dry when spread. It has an average density of 135 pounds per cubic foot. Equipment was kept off the base until 7 days had elapsed. Required strength of 1,500 pounds in 28 days was met and surpassed, with some of the sample cylinders indicating a compressive strength of over 2,000 pounds per square inch when tested at 7 days.

Bituminous-Concrete Surface

When the base was completed, its surface was swept with a rotary broom in front of a Fordson tractor. It was then topped with two 1-inch courses of bituminous concrete, both the same mix. The material came from the same plant that supplied the base mix. Hot-mix batches of 2 tons were hauled to the job in 6 trucks holding 5 batches or 10 tons each. The Cummer asphalt plant has a capacity of 150 tons an hour with its 2½-ton pugmill. The dryer is 50 feet long x 6 feet in diameter, and has both internal and external sources of heat. A combustion chamber at the intake end is 10 feet long.

Material was laid by a Barber-Greene Finisher, first the leveling or binder course, and then the top. The 10-foot lanes were staggered over the longitudinal joints of the base. The center lanes were done first, with the work progressing toward the sides of the runway. A crown of 1 inch in 10 feet was held; surface tolerance was ¼ inch in 16 feet. The plant-mix was rolled by 3-wheel and tandem rollers.

Portland Cement Association Photo

A Galion roller compacts gravel-cement runway mix to 6 inches, as an Apsco spreader works in the adjoining 10-foot lane at the new Philadelphia, Ohio, Airport.

The mix contained the following in a typical 2-ton batch:

Asphalt, 120-150 penetration	240 lbs.	6	per cent
Sand	2,060 lbs.	54	per cent
Crushed gravel	1,700 lbs.	40	per cent
Total	4,000 lbs.	100	per cent

The top course was sealed with an application of 0.13 gallon to the square yard of asphalt emulsion, which was covered with 15 pounds to the square yard of slag graded from ⅜ inch down. The cover stone was put on by a Buckeye spreader and was rolled in. Excess aggregate was swept off by a Littleford power broom. The sealing was not considered a necessity, but the slag aggregate gave the runway a light-colored surface that was deemed of assistance to pilots.

A strip 100 feet wide on each side of the runway was fertilized and seeded. Lime was first put on at the rate of from 3½ to 5½ tons per acre, according to the findings of a soil analysis. This was followed by 300 pounds per acre of 10-6-4 fertilizer, and 100 pounds per acre of seed. The seed mixture was:

	Per Cent
Kentucky bluegrass	50.17
Creeping red fescue	22.54
Redtop	11.70
Common ryegrass	5.88
Inert	8.86
Weeds	.85
Total	100.00

(Concluded on next page)

KEEP INFORMED—

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For further information and literature on products described in this issue, turn to page 16 for the Red Request Card. Our Reader Service Department will be glad to help you.

•

Contractors and Engineers Monthly

470 Fourth Ave.

NEW YORK 16, N. Y.

CHEVROLET

ADVANCE-DESIGN TRUCKS

POPULARITY LEADERS Chevrolet trucks are the favorites by far! In every postwar year truck users have bought more Chevrolets than any other make. And that's proof of the owner satisfaction they have earned!

PERFORMANCE LEADERS Chevrolet trucks give you high pulling power over a wide range of usable road speeds . . . cut down total trip time with high acceleration on the straightaway.

PAYLOAD LEADERS Careful design and rugged construction permit you to haul more goods more miles—at lower cost per ton mile! You enjoy real savings on operating and repair costs.

PRICE LEADERS You're money ahead with Chevrolet trucks! Chevrolet's rock-bottom initial cost—outstandingly low cost of operation and upkeep—high-trade-in value, all add up to the lowest price for you.

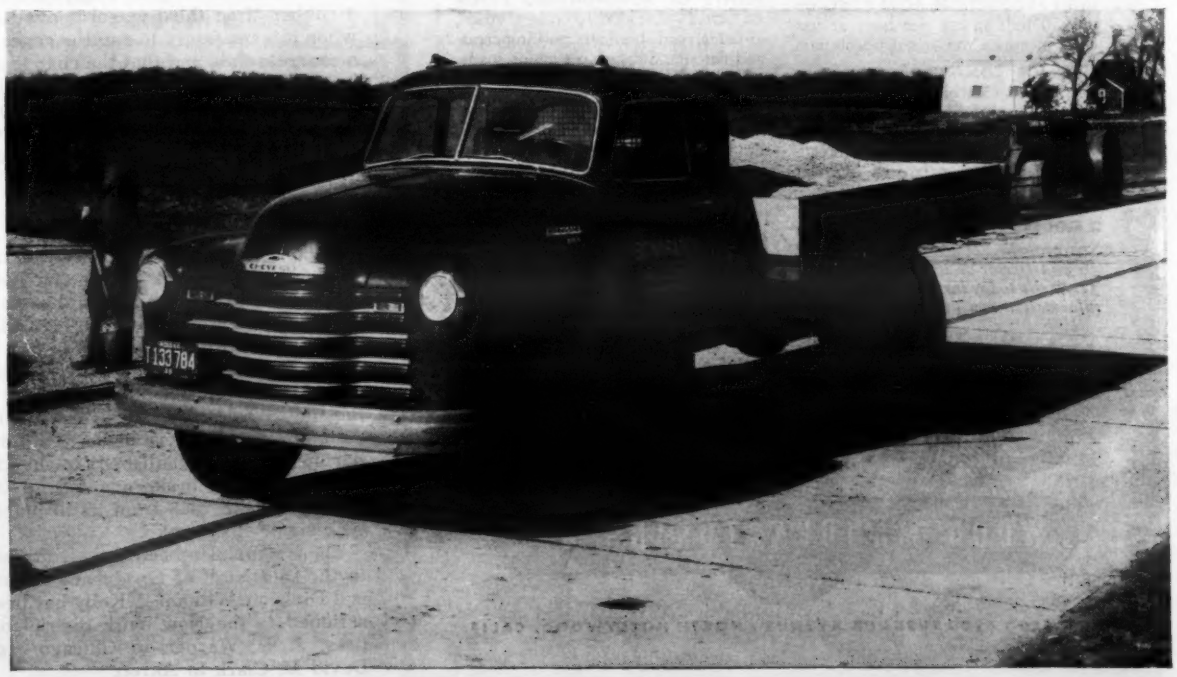
Packed with VALUE . . . *Primed with* POWER

Chevrolet Advance-Design trucks have everything it takes—and plenty to spare. Rugged construction to withstand the wear and tear. Handling ease and comfort to lighten the load of a day's work. And more power than ever! Two great Valve-in-Head engines—the Loadmaster 105 h.p. and the Thriftmaster 92 h.p.—make these the most powerful trucks Chevrolet has built! Yes, these new jobs bring you peak value—and at a low price. They cost surprisingly little to buy, to run and maintain. That's why Chevrolet trucks outsell them all!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICH.

AHEAD WITH ALL THESE PLUS VALUES

• TWO GREAT VALVE-IN-HEAD ENGINES: the New 105-h.p. Loadmaster and the Improved 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • THE NEW POWER-JET CARBURETOR: smoother, quicker acceleration response • DIAPHRAGM SPRING CLUTCH for easy action engagement • SYNCHRO-MESH TRANSMISSIONS for fast, smooth shifting • HYPOID REAR AXLES—5 times more durable than spiral bevel type • DOUBLE-ARTICULATED BRAKES—for complete driver control • WIDE-BASE WHEELS for increased tire mileage • ADVANCE-DESIGN STYLING with the "Cab that Breathes" • BALL-TYPE STEERING for easier handling • UNIT-DESIGN BODIES—precision built.



Gravel-Cement Base Shaves Runway Costs

(*Continued from preceding page*)

Quantities and Personnel

The major items in the runway construction contract included the following:

Unclassified excavation	52,288 cu. yds.
Lean rolled-mix concrete base, 6-inch	56,350 sq. yds.
Portland cement	7,680 bbls.
Aggregate, bituminous surface	5,660 tons
Asphalt cement	440 tons
Asphalt emulsion for seal	16,905 gals.
Cover aggregate	425 tons
Seeding	21 acres

Edgar Spring, Inc., the general contractor, was represented on the project by James Spring, General Manager. Homer Rausch was Superintendent on the asphalt operations. Robert Spring supervised the seeding and landscaping operations, while William Oyler, Jr., was Superintendent on the grading and base work for Oyler Bros., the subcontractor. The field force at the airport averaged 15, with 5 others engaged at the asphalt plant and gravel plant.

C. & E. M. Photo

Two 1-inch courses of bituminous concrete topped off the gravel-cement runway base on the Edgar Spring job. Here a Barber-Greene Finisher lays the 1-inch leveling course.

Charles J. Marr and Henry Moore jointly contracted with the city for the engineering services.

For the Civil Aeronautics Administration, E. H. Scofield is District Airport Engineer, supervising the project, with headquarters at Columbus, Ohio.

A Glass-Reinforced Waterpoofing Paper

A tough waterproof paper said to be nondeteriorating, has been developed by Glas-Kraft, Inc., of Lonsdale, R. I. All-directional reinforcement in Glas-Kraft comes from continuous glass fibers swirled in between two plies of Kraft paper which are then bonded under heat and pressure in an all-weather waterproof laminant.

This paper, the company points out, may be used for protecting steel, wire stock, cement, chemicals, and other materials in storage. It may also be used for temporary tarpaulins and as a vapor barrier, side-wall sheathing, or protective floor covering in concrete construction and curing work. Glas-Kraft, the company claims, is hard to puncture and difficult to tear. It is available in three standard grades, in rolls or sheets, and in widths up to 96 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 143.

Gage Converts Grader For Fine-Grading Operation

A 4-page folder illustrating a gage which converts standard road graders to fine-graders has been prepared by the Roadgrader Gauge Corp., P. O. Box 1087, Wilmington, Del. It points out that the gages can be attached to any motor grader, one on each side of the moldboard, with a few simple adjustments, to provide fine-grading to any desired depth; they can be removed easily, too, permitting the machine to perform a variety of work.

The literature shows the device in use on a number of jobs. It explains that a rubber-tired third wheel is available when it is necessary to run the gages on a concrete slab, and that the change can be made in a few minutes. Testimonials from users are included in the folder.

This literature may be obtained from the company. Or use the Request Card at page 16. Circle No. 44.

Goodyear Men Move Up

Robert W. Maney, in charge of tire production at Plant 2 of The Goodyear Tire & Rubber Co. in Akron, has been named Plant Manager in Los Angeles. He succeeds Frank A. Steele, who is retiring on September 1. C. A. Hulsemann has been appointed Manager of the Industrial Brake Sales Department, Aviation Products Division. The department was established to handle Goodyear's disk brake adapted for industrial use in 1948 from its airplane-type single-disk brake.

There have also been three additions to the sales staff of Goodyear's Chemical Division. William E. Kelly has been assigned to the New York district offices, J. E. Warner to Chicago, and David M. Clark to Akron.

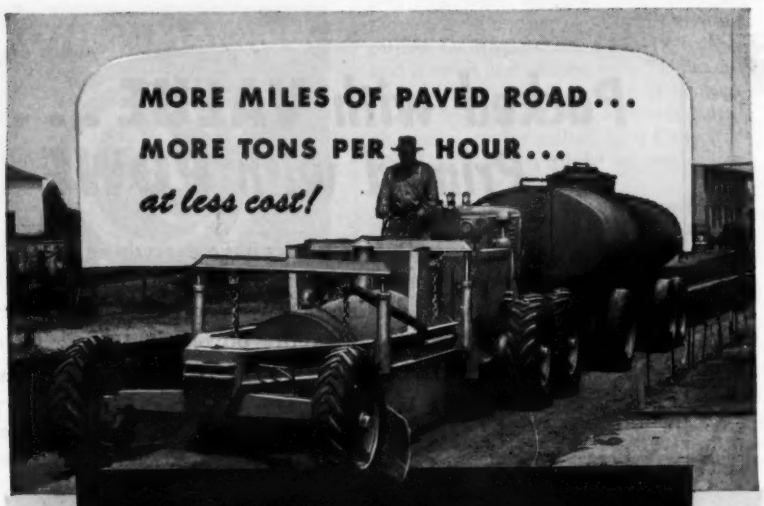
A New Welding Rod

A new tungsten carbide electrode to be used with ac or dc welding machines has been developed by Mir-O-Col Alloy Co., Inc., 312 North Ave. 21, Los Angeles 31, Calif. The coating, covering a core wire, is impregnated with tungsten carbide particles, of various mesh size, for a smooth deposit of 60 per cent tungsten and 40 per cent iron, using low amperage.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 135.

Skilsaw Expands Again

By September 1, some 35,000 square feet of floor space will have been added to the plant of Skilsaw, Inc., manufacturer of portable electric and pneumatic tools. This is the eleventh addition since the company moved into its present plant on Elston Avenue in Chicago. Contractor for the expansion is the Austin Co.



WOOD ROADMIXER

The Wood Roadmixer is your best answer to modern low cost mix-in-place construction. Here's why:

LESS MANPOWER—this *one man operated* traveling mixing plant takes low cost native materials and thoroughly mixes with emulsion, road oil or soil cement binders in one pass—windrowed and ready for spreading and compaction.

HIGH PRODUCTION, LOW COST—up to 350 tons mixed per hour at less than 7 cents a ton is not uncommon.

FULL JOB CONTROL—from start to finish. You control the rate of travel, the pressure of binder, the uniform pickup of material. With measured windrow and supervision of aggregate you're assured a surface of uniform quality every time!

SELF PROPELLED—to and from the job speeds of 15 MPH and working speeds up to 40 ft. per minute!

MORE THOROUGH MIXING—pug mill mixing drum provides 200 mixing passes in 45 seconds! Compare this to the 1 to 4 passes provided by other mixers.

MANEUVERABLE as a motor patrol—uses pneumatic tires. Assures adequate traction in low bearing soils.

PLENTY OF ROADBUILDING APPLICATIONS—surfaces secondary roads, airfields, road shoulders, parking areas and detours. Subsurfaces major roads and airfields.

ACCEPTED AND RECOMMENDED by a majority of state highway departments, by the Civil Aeronautics Authority, U. S. Bureau of Public Roads, and the U. S. Army and Navy.

3 MODELS AVAILABLE

Self-propelled Models 42 and 36 and tractor-drawn Model 54. Write today for complete information and prices.

Model 42 Roadmixer *Illustrated.*

ROADBUILDING EQUIPMENT

WOOD MANUFACTURING CO.

BOX 620 - 6900 TUJUNGA AVENUE - NORTH HOLLYWOOD, CALIF.

IT TAKES THE RIGHT KIND of POWER

SUPER-VULCAN

OPEN TYPE
DIFFERENTIAL — ACTING
PILE HAMMERS
18C, 30C, 50C and 80C

In pile driving, choose the power of Super-Vulcan, the rugged, positive-action hammer that delivers more blows per minute and drives any kind of pile down on schedule with profit-making economy.

Ask any user about Super-Vulcan's rugged strength, compactness, simple operation, cost saving, and proven performance. The open type fits the same leads, uses the same accessories, as the Warrington-Vulcan Single-Acting Pile Hammer.

Choose durable Super-Vulcan, the perfect answer to your pile driving problems. Write for complete details today.

Sizes 18C-30C-50C-80C meet all needs

VULCAN IRON WORKS Since 1852
329 North Bell Avenue
Chicago 12 ---Illinois

Two-Way Automatic Safety Check Valve

A newly developed 2-way automatic safety check valve has been announced by Danielson Safety Valves, Inc., 224 Sixth St., Richmond, Calif. It is designed to prevent injury to workmen, save time, and increase the service life of pneumatic equipment.

The valve may be installed at the air outlet on a compressor or manifold and may be placed before or after the shut-off valve. Its action is governed by the velocity of air passing through the hose. When there is a restriction at the end of the line, the ball lies at rest in the bowl, giving the pneumatic tool full air pressure. If the hose breaks, or the tool is uncoupled, the quick escape of air instantly forces the ball into the seat of the valve where it checks the air flow.

The Danielson valve is automatic in two ways. The small bleeder port creates the reverse automatic action. With the ball in checking position, the bleeder port is free to pass air into the hose. When the tool is attached to the end of the line, air pressure immediately goes up until the pressure in the line approximates the pressure in the compressor or manifold, whereupon the ball drops back to resting position by gravity. If the ball fails to drop, it is because a major leak in the hose or pneumatic tool prevents air pressure from building up in the line. This indicates that repair is necessary in the equipment or hose. This feature eliminates waste, and prevents air loss and unnecessary strain on compressors. Additional saving is made in time, since the workmen need not return to the compressor to turn the air on or off. The safety feature prevents whipping air lines as a result of a break in high-pressure lines. These valves are manufactured in seven sizes: ¼, ½, ¾, 1, 1¼, 1½, and 2-inch.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 51.

Paint Remover Also Removes Scale, Rust

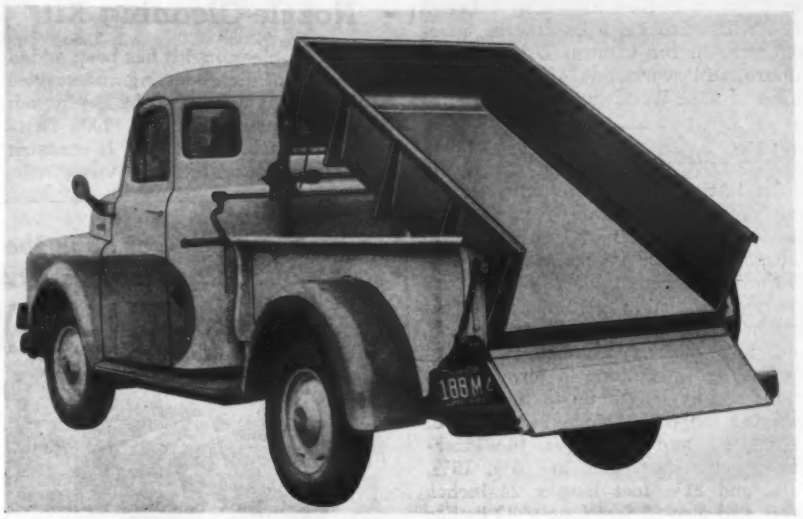
A new paint-removing burner also removes scale and rust and dehydrates metal surfaces, leaving them clean for repainting. It is manufactured by the National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill., and is designed for attachment to NCG's Torchweld 75 hand cutting torch.

The burner uses an oxyacetylene flame, supplemented by a low-velocity flow of pure oxygen, to give rapid oxidation of the heated paint. Replaceable wear-resistant guide shoes maintain correct distancing of the burner from the metal surface.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 57.

Pick-Up Converted Into a Dump Truck

A new patented "slip-in" body has been developed by Converto Mfg. Co., Cambridge City, Ind., to convert pick-up trucks to dump trucks. It can be installed in conventional pick-up bodies or on platform types, with no attachments required. Its hand crank enables the operator to dump any load commonly hauled by pick-ups, says the company.



This is the Converto "slip-in" body which converts pick-ups into dump trucks. It has a hand crank and is installed with no attachments.

Converto also manufactures a pic-UPac hydraulic-hoist conversion kit for changing a pick-up truck into a dump truck. This kit may be operated manually from any location on the truck or driven electrically from a cab-controlled Blackhawk pump. Its lifting capacity is 6,000 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 54.

New Division for Fleming

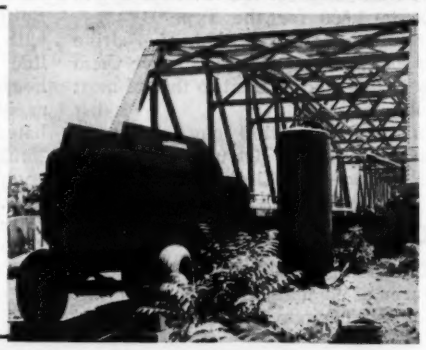
The Fleming Mfg. Co., St. Louis, Mo., has opened a Material Handling Division which will specialize in material-handling equipment used in the concrete-products and ready-mixed-concrete industries. John F. Van Way has charge of the new division. He was formerly connected with C. S. Johnson Co. and the Erie Steel Construction Co., and has had many years of experience in this field.

You hear it from coast to coast.*..

"It's BLUE BRUTES For My Money!"

*PENNSYLVANIA
A 315' Portable Compressor and UMW Wagon Drill, one of many Blue Brute teams owned by Cramer Construction Co. of Lebanon, Pa. Pres. G. B. Cramer writes: "We have used Blue Brutes for several years, and on our Lebanon Veterans' Hospital job have five Blue Brute Compressors powering Worthington Wagon Drills and Rock Hammers. As evidence of their entirely satisfactory performance we recently purchased another 315' Blue Brute Compressor."

*OHIO
In Waterville, Ohio, the Crawford Steel Construction Co., Inc., of Cincinnati, erected the structural steel on the new highway bridge across the Maumee River. Company official J. A. Crawford says: "Our 210' Blue Brute Compressor is efficient, well constructed and rugged. It has given us excellent service, and we are more than willing to recommend it highly . . . This first experience with your products is evidence to us of Blue Brutes' superiority.



*OREGON
It's another Blue Brute UMW Wagon Drill. Ready to swing into action at any angle, it is here helping to cut through a road cut where the timber grows tallest. The Kuckenberg Construction Company of Portland, Ore., are the owners and the report from this firm says they "wish all their other machines on the job were as good . . . and are going to change to Blue Brutes in future replacements."

*WISCONSIN
Opening up a new limestone quarry in Sussex, Wisconsin, is easy work for these rugged, hard-hitting Blue Brute team-mates. The fast, versatile UMW Wagon Drill is drilling 6-foot holes for explosive charges. Power source is a 315' Blue Brute Compressor, that gets all the air out of every drop of fuel. Vice-President Lloyd Wolf of the Quality Limestone Corporation, reports: "After thorough investigation we decided Worthington equipment was best . . . They are fine machines."

From the Atlantic to the Pacific you'll find Blue Brute owners — on every type of construction project, from the smallest to the largest — glad to tell you of the cost-cutting, trouble-free performance that is helping make estimates pay handsomely.

There are a lot of sound reasons for this country-wide acclaim — all adding up to the fact that *there's more worth in Worthington*. Your nearby Worthington-Blue Brute Distributor is ready with those reasons, and can make immediate deliveries. See him, or write us direct.

Worthington Pump and Machinery Corporation
Construction Equipment Department
Harrison, New Jersey
Distributors In All Principal Cities
WORTHINGTON

BUY BLUE BRUTES

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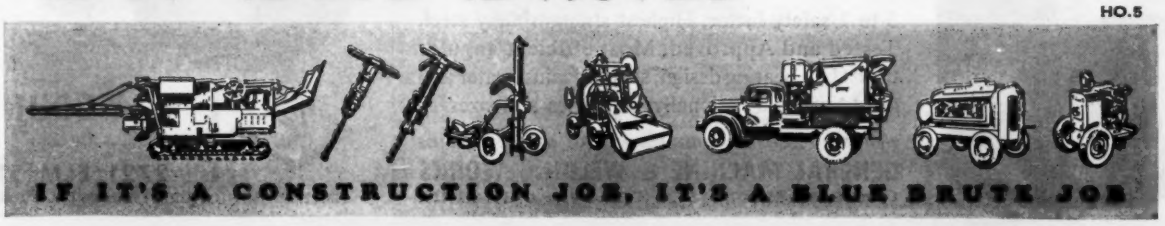


McKIERNAN-TERRY
Ruggedly-Built
PILE EXTRACTORS
Provide exceptional pulling power, with the sharp sharpness of blow needed to vibrate and loosen stubbornly set piling. These double-acting extractors come in two standard models—heavy and extra heavy. Standardized line also contains 10 double-acting hammers and 5 single-acting hammers. Write for free Bulletin.
Also builders of coal and ore bridges, bulk material unloaders, bridge operating mechanisms, hoists and marine equipment, and specially designed machinery.
McKIERNAN TERRY CORPORATION
Manufacturing Engineers, 19 Park Row, New York 7, N. Y.

From the gear end, one of the 2-cylinder diesels introduced by ABOE; it has a half-speed shaft extension.

New Rugged Diesels In the Low Hp Range

A new line of British diesel engines in the low horsepower range, designed for contracting service, has been introduced in this country by ABOE, Inc., 57 Park Ave., New York 16, N. Y. These Petter engines, the company says, are the smallest in the world to use an open combustion chamber with direct injection. This feature, they say, provides easy starting, lower fuel consumption, and smooth operation. Designed for use on winches, concrete mixers, saw benches, conveyors, pumps, generator sets, compressors, hoists, etc., the line has a power rating from 3 to 36 hp.

The Type AV engine manufactured by the company is available in one and two-cylinder models with a rating of 6 horsepower per cylinder. These engines have a 3.15 x 4.33-inch bore and stroke, and may be obtained in air or water-cooled models. The Type B engine is available in 2, 3, and 4 cylinders with a rating of 9 hp per cylinder. This line has a 4.33 x 4.33-inch bore and stroke, with a water-cooled system. Though designed for operation in the 1,000 to 1,800-rpm range for the AV engine, and 1,000 to 1,500 for the Type B, these engines may be used with an over-drive gear having a 1.62:1 ratio to give them a shaft speed equivalent to that of most gasoline engines.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 19.

Kennametal Appointments

Kennametal Inc., Latrobe, Pa., manufacturer of cemented carbide tools, has appointed Thomas J. Kniff, Jr., representative in its New York City Office at 11 W. 42nd St., and Fred Moore, representative in the Central District. Mr. Moore will work out of the Detroit office at 5531 Woodward Ave.

Sectional Conveyors

An illustrated bulletin on sectional conveyors is available from Robins Conveyors Division of Hewitt-Robins, Inc., 270 Passaic Ave., Passaic, N. J. These units, the catalog points out, are easily assembled in the field and consist of a head (drive) section, a tail section, and any desired number of intermediate truss sections to form a conveyor of any length up to the limitations of the belt. Made in widths of 18, 24, 30, and 36 inches, the intermediate truss sections are 6½, 15½, 18½, and 21½ feet long x 24 inches deep, and also 24 feet long x 42 inches deep. Both depths can be used on the same length of conveyor by means of a transition section 24 inches deep at one end, tapering out to 42 inches deep at the other.

Bent supports for setting the conveyor on a grade range from 4 to 50 feet deep or more. A decking of 16-gage curved plate forms a protective separation between carrying and return strands of the Hewitt rubber belt. The folder illustrates the two types of take-ups available: the protected screw type for conveyors up to 200 feet long and the vertical gravity type for longer installations.

This literature may be obtained from the company by requesting Bulletin No. 132. Or use the Request Card at page 16. Circle No. 20.

Contractors' Hoists

A 4-page catalog describing contractors' steel-frame hoists has been prepared by the Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif. Both single and double-drum hoists with capacities up to 5,000-pound single-line pull are presented. The various horsepower requirements and line capacities for each of five models are listed. All models feature heavy-duty Timken-bearing air-cooled gasoline engines, a rigid-steel electrically welded frame, machine-cut gears, Alemite lubrication, sealed ball bearings, and double-faced clutches.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 7.

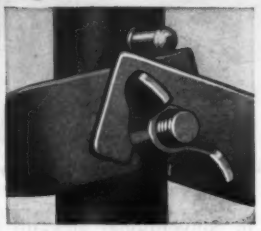
Nozzle-Cleaning Kit

A nozzle-cleaning kit has been added to the line of diesel-testing and service equipment manufactured by Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa. It contains the cleaning wires, pin vises, wire brush, bristle brushes, and lapping compounds required to clean out clogged nozzles, protect injector parts and keep them working efficiently.

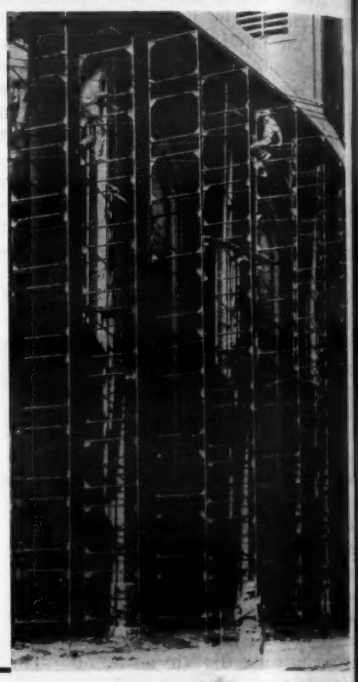
Further information may be secured from the company by requesting Leaflet 614. Or use the Request Card at page 16. Circle No. 47.

Get up in the world faster with this BRACE LOCK, exclusive with

BIL-JAX SCAFFOLDING



Braces are easily attached and removed WITHOUT REMOVING WING NUTS

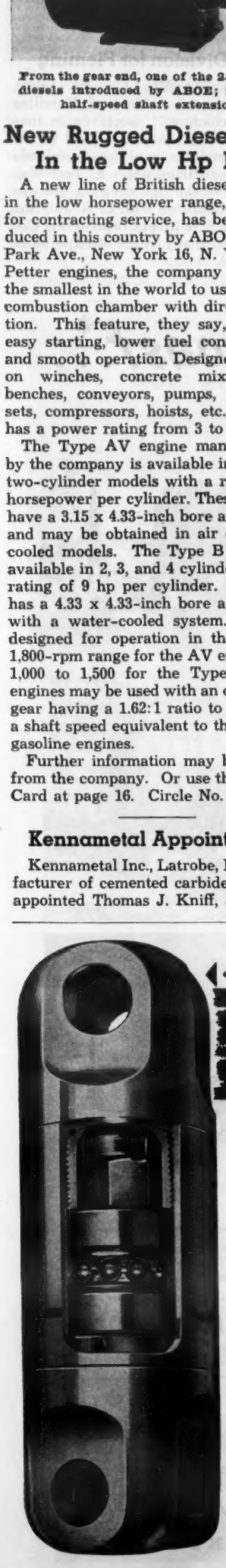


Now . . . Bil-Jax takes only a fraction of the time needed to erect or dismantle ordinary steel scaffolding. Cross braces attach to end frames by merely placing slotted ends onto studs, then tightening wing nuts. Braces are removed by simply loosening wing nuts a few turns. It is never necessary to completely remove wing nuts, and no tools are required.

Investigate Bil-Jax sale and rental plans

Write for complete catalog

BIL-JAX INC. ARCHBOLD - OHIO U.S.A.



"NEEDED ON ALL WIRE LINES"

For Concrete Buckets, Demolition Balls, Hoisting and Traveling Blocks

Miller "THE ORIGINAL" SWIVELS

ELIMINATE WIRE LINE TWIST AND KINKING UNDER MAXIMUM LOAD

SAVE TIME—No time lost with spinning loads. No tag lines needed. Operations speeded.

SAVE MONEY—Lines last longer. More efficient use of men and materials.

SAVE LIVES—Operator has greater control of load. Danger of wire lines breaking greatly reduced.

5 to 1 safety factor, Highest strength alloy steel, Tested and Approved, Most efficient angular thrust ball bearing design, sealed against water and dirt. Available nationally, All types and sizes.

WRITE FOR FULL INFORMATION AND PICTURES OF SWIVELS IN USE

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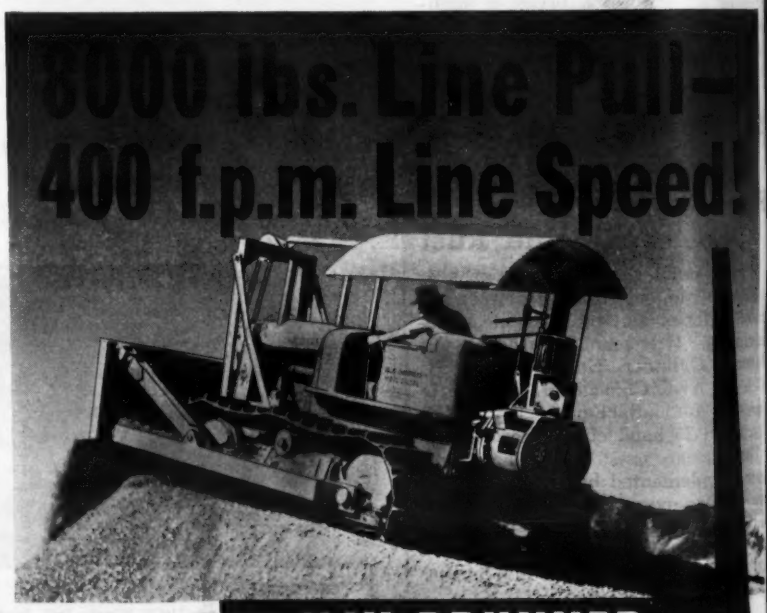
8000 lbs. Line Pull— 400 f.p.m. Line Speed!



KAY-BRUNNER POWER CONTROL UNITS Will Meet Any Cable Control Requirements

For bulldozing, scraping, rooting, earth moving, light logging, or for any kind of cable control work, there is a Kay-Brunner Power Control Unit to fit the job. Line pulls from 5000 to 9500 lbs., line speeds from 250 to 400 f.p.m., and gear ratios from 5-1 to 12-1 give the tractor operator ample power, fast response and precise control for his work.

Alloy, heat-treated, cast steel cases and covers; alloy steel gears, cone-type clutch, swinging fairleads and easy field servicing assure long life, dependable action, versatility and easy maintenance.

There is a Kay-Brunner Power Control Unit for *your* tractor—for *your* job. Write for Bulletin 364-ED.

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POWER CONTROL UNITS • LAND LEVELERS • DOZERS AND TRAIL BUILDERS • RIPPERS • CARRYING SCRAPERS • TAMPING ROLLERS • HYDRAULIC CONTROL SYSTEMS

Headwater Dam Will Check the Merrimack

Earth Embankment and Long Spillway Cut Are Completed To Forge Another Link in Flood-Control Chain

(Photo on page 1)

✦ WITH the completion of a flood-control dam at West Peterborough, N. H., the Department of the Army, Corps of Engineers, has forged another link in a chain of flood-control projects in New England. The new earth embankment in the hills of southern New Hampshire lies across Nubanusit Brook, a tributary of the Merrimack River. The latter waterway, along with the Connecticut River, has been one of the two most troublesome streams in the northeastern part of the country during flood time. This dirt barrier, far upstream in the headwaters, will be a potent factor in lessening the danger from high water in the lower reaches of the Merrimack where it passes through congested industrial areas on its way to the Atlantic.

Work on this $1,300,000 project in its early stages was described in CONTRACTORS AND ENGINEERS MONTHLY in the August, 1949, issue on page 52. M. DeMatteo Construction Co., Inc., of Quincy, Mass., had the general contract which got under way in April, 1948, and was completed early this year. The main feature is an earth dam approximately 1,000 feet long and 60 feet high, with a maximum width through the base of 280 feet. Its 25-foot crown carries an 18-foot macadam road pavement. The inner cross section of the dam is composed of impervious material reaching down into a core trench that has a maximum depth of 20 feet to bedrock. The rest of the material is random and pervious fill.

A reinforced-concrete conduit was constructed in open cut through ledge rock to carry the normal flow of the brook through the dam. It has a 7 x 7-foot opening with walls 2 feet thick, and is approximately 345 feet long, including 32 feet of gatehouse at the upstream end and a stilling basin 77 feet long at the downstream end. The structure was completed by June, 1949, and the brook diverted through it, thus permitting the dirt work in the embankment to proceed along the full length of the dam.

While the dirt-moving was in progress, the gatehouse which controls the flow of water through the conduit was constructed. It measures 27 feet 5 inches x 23 feet 6 inches, and is 63 feet high, its top being level with the crown of the dam. On top of this concrete gatehouse a structural-steel and brick superstructure 21 feet high was erected to house and provide operating room for the gate control equipment. Concrete for the structure, which has walls 2 feet thick, was delivered by truck-mixers from a batch plant set up on the job site.

Rocky Spillway

An unusual aspect of the project was the open spillway channel, nearly a mile long, that was located 4 miles north of the dam. This channel empties eventually into Contoocook River. The cut averages 150 feet in width at the top, with 2 to 1 side slopes, and has an average depth of 20 feet, though at one location a maximum depth of 50 feet was reached. About midway in the channel a concrete ogee-type weir was built with a height of 5 feet. Its crest is at elevation 946.0, or 21 feet below the top of the dam. Part of the material excavated was hauled from the spillway and placed in the dam embankment. Part, including some huge boulders which were encountered in the cut, was wasted in areas adjoining the spillway. The cut supplied rock which was dumped on the faces of the dam.

The rest of the material for the embankment came chiefly from the conduit excavation or from a borrow pit which supplied the necessary pervious material. Hauls from the borrow pit averaged about a mile. The fill was placed in 6-inch lifts and compacted with 6 passes of a sheepsfoot roller.

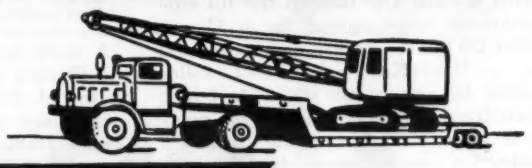
In order to maintain an adequate supply of clear water at a normal operating head for processing purposes at Verney Mills (a rayon-textile manufacturing company), downstream from the dam site, one 8-inch electric-powered pump and one 8-inch gasoline-powered stand-by pump were used to pump water from upstream of the construction area to the mills approxi-

(*Concluded on next page*)

C. & E. M. Photo
In the borrow pit, a Lima 2-yard shovel loads a 13-yard bottom-dump Euclid with pervious material for the West Peterborough Dam.

Before you buy *any* trailer

***Look at* LaCROSSE**



Look at the WEIGHT!

Elimination of heavy castings by La Crosse saves up to 2000 lbs. useless dead-weight per trailer . . . lets you haul more pay load at lower cost per mile.

Look at the FRAME!

La Crosse exclusive "tailoring" of main beams — without cutting gooseneck flanges — assures greatly increased strength. No moving parts to get out of alignment in vital gooseneck.

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Big La Crosse constant rise "S" cam brakes run cooler, stop faster without grabbing. Tough 3/4" bolted-on linings last up to 45% longer than ordinary linings.

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La Crosse gives you more trailer value for your money — more pay-load capacity, more strength, more dependability — backed by 17 years of trailer leadership.

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America's Favorite LOW BED TRAILER

BUY NOW and SAVE
BRAND NEW! WAR SURPLUS
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It's Unbelievable
50 to 75% SAVINGS
Use for: Farms, cottages, stores, garages, floodlighting, drilling rigs, refineries, house trailers, fire departments, sound trucks, yachts, tugs, construction, airports, police radios, etc.

Below are TWO of the most SENSATIONAL light plant buys in the country:

2500 WATT, AC, 115 Volt, 60 Cycle, Single Phase. ENGINE Briggs & Stratton, air cooled, 6½ HP. GENERATOR: Westinghouse or Leland, belt drive with guard and Duplex receptacle mounted. NET WEIGHT 310. Gross shipping weight 441. Shipping size 36"x19"x26". Complete with $30.00 worth of spare parts and rubber cable valued at over $100.00, tools, instructions and fully GUARANTEED. WAS FORMERLY PRICED AT APPROX. $700.00.
NOW PRICED FOR YOU AT ONLY ..... $295.00 NEW
Reconditioned $225.00
Generator only, NEW.....$145.00

5 KW, 120 Volts, 60 Cycle, AC, ENGINE: Hercules 4 cycle, Gasoline. GENERATOR: Mfr'd by Hobart Bros. Unit includes remote control cable on reels valued at $300. 150' of 2 wire No. 6 and 150' of 3 wire No. 18, exhaust pipe, power cable plug, remote control stop start switch, automatic volt regulator. Continuous duty 6.3 KVA at 80% power factor, frequency meter, radio and television filtered. Unit is completely automatic and cannot be damaged by lack of care. Net weight 770 lbs. Shipping weight 1070 lbs. 44" long, 23¼" wide, 30" high. 220 volt output can be supplied on all units at a small additional cost. FORMERLY PRICED AT $1600.00. NOW PRICED FOR YOU AT ONLY..... $495.00 Guaranteed

750 to 1000 Watt, All Single Phase, 110 Volt, AC, NEW $179.50

VOLTS	WATTS	PRICE
110-220	300	$ 89.50
110	7500	575.00
110-220	10000	995.00
110-220	25000	2100.00
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All units of 10,000 Watts or over are 110-220 Volts and single or 3 phase.

WAR SURPLUS
Below are just a few of the many items we have in stock at sensationally low prices:
Builders trailer; Dual wheels, 8 ply tires 9:27. Price $265.

Pumps
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GAS ENGINES
Briggs & Stratton NEW in original crates. Model AP 1¾ to 2½ HP. ¾" shaft. List Price $102. Your price
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Used Briggs-Stratton Model ZZP 5 to 7 HP List $143. GUARANTEED. ONLY $69.50.

"MERCURY CLUTCH"
For motor-scooters, motorbikes, lawn mowers, etc. Can be used with electric motor or any gas engine. "A" belt pulley. List price $28.00. YOUR price ¾" bore $7.95. ¾" bore $8.95.

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C & H ELECTRIC CO. • 426 W. JUNEAU ST. • MILWAUKEE 3, WIS.

Headwater Dam Will Check the Merrimack

(*Continued from preceding page*)

mately 3,000 feet downstream. The water was pumped through an 8-inch steel pipe along the east bank of the river. Pumping was maintained 24 hours per day on a schedule of 7 days per week until the danger of turbid water, resulting from construction operation, had been eliminated. The section of pipe extending through the dam was left in place and filled with grout after the pumping system was no longer required.

Equipment

Equipment used in the removal of rock included 3 Joy and 3 Worthington wagon drills; 8 Worthington jackhammers; 3 Worthington 500-cfm air compressors; a Gardner-Denver and Chicago Pneumatic compressor at 315 cfm; and an Ingersoll-Rand 105-cfm compressor used with a jackhammer on boulder splitting. Timken Carbolyd bits on the wagon-drill steel averaged 150 feet per bit in the tough granite and seamy rock drilling. Both American and Hercules 40 and 60 per cent dynamite served to blast loose the rock.

Excavators included 4 Northwest rigs—2 at 2½ yards and 2 at 1½ yards; a Lima 2-yard; a Bucyrus-Erie ¾-yard; and a Lorain ¾-yard unit. Material was hauled in 12 Euclids—6 end-dumps holding 10 yards, and 6 bottom-dumps at 13 yards; and 20 trucks, chiefly Sterlings and Autocars, averaging 7 yards a load. The lifts on the fill embankment were spread by 5 Caterpillar D8 tractor-dozers, and compacted by a Blaw-Knox sheepsfoot roller pulled by one of the D8's. A 4-inch centrifugal high-pressure pump powered by a Chrysler engine furnished water for use in compacting the pervious fill.

A useful piece of maintenance equipment was the contractor's machine shop on wheels, a Chevrolet truck outfitted compactly and thoroughly with the necessary tools for quick repair work in the field. On either side of an open well through the center of the truck body are metal compartments for spare replacement parts that are most in demand. The truck also carries oxy-acetylene cutting torches and a Lincoln electric welding machine, along with an assortment of hydraulic jacks and a complete set of socket wrenches. On top is a collapsible boom that extends out to a length of 15 feet and supports a 4-ton chain fall. At the rear the tailgate drops down to form a workbench complete with vise. The varied stock carried contains everything from parts books to welding rods.

C. & E. M. Photo

Martin DeMatteo stands alongside a Chevrolet service truck—a machine and repair shop on wheels. It saw to the care and feeding of equipment on the West Peterborough Dam contract in New Hampshire.

Quantities and Personnel

The major items on the flood control project included the following:

Common excavation	425,000 cu. yds.
Pervious borrow	140,000 cu. yds.
Rock excavation, dam	5,300 cu. yds.
Rock excavation, spillway	60,000 cu. yds.
Pervious fill	96,700 cu. yds.
Random fill	45,300 cu. yds.
Impervious fill	43,300 cu. yds.
Sand and gravel fill	19,700 cu. yds.
Dumped rock	36,280 cu. yds.
Concrete	4,090 cu. yds.
Cement	6,000 bbls.
Steel reinforcement	225,000 lbs.

A work force averaging between 50 and 60 men was employed on the dam by the M. DeMatteo Construction Co., Inc., under the personal direction of Martin DeMatteo, with John Ryan as Superintendent on the latter half of the construction.

The Department of the Army, Corps of Engineers, was represented at the site of work by Clifford H. Tilley, Resident Engineer. The New England Division, which designed and supervised the construction of the flood-control project, is headed by Acting Division Engineer Lt. Col. G. W. Carlson. Chief of the Operations and Construction Division is C. J. Murray.

Remember—Safety Is No Accident!

Data on Manila Rope

A new reference chart which gives specifications on manila, Nylon, and sisal ropes is available from the New Bedford Cordage Co., New Bedford, Mass.

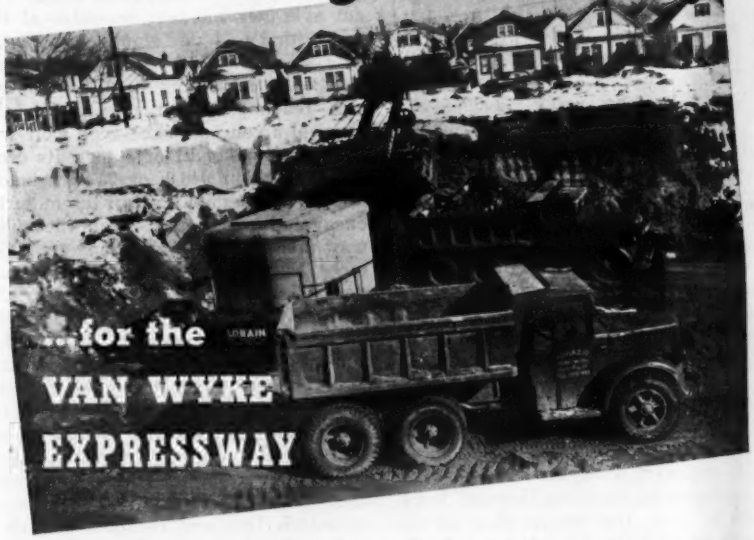
Data such as rope diameter, circumference, approximate net weight of 100 feet, approximate gross weight of full coils, breaking strength, and working strength are included on the 17 x 22-inch wall chart, for rope sizes ranging from 3/16 to 3/4 inches in diameter. In addition, the chart lists the various New Bedford ropes, and explains New Bedford's exclusive dispensing carton and pre-measured ropes.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 125.

Hine Joins Wood Mfg. Co.

Charles R. Hine is now General Sales Manager for the Wood Mfg. Co., North Hollywood, Calif. Formerly Vice President and Sales Manager of the LeRoi-Rix Machinery Co., Los Angeles, he brings to his new position over thirty years of experience in the sales and service of construction equipment.

Clearing the way



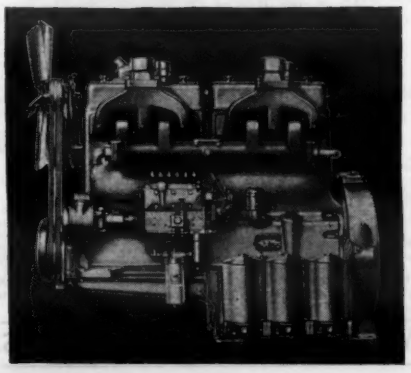
● Earth must move—before traffic can. So they're digging with Diesels—Waukesha Super-Duty Diesels! And at the rate the shovel is digging against this 16½-ft. embankment, that new New York State highway—the Van Wyke Expressway—will be completed in 1950 right on schedule.

The place is Long Island. The E. J. Varrone Construction Co., South Ozone Park, Long Island, N. Y., own the shovel. It's a 2-yd. 820 Lorain shovel—powered by the Waukesha Super-Duty Diesel Six.

It's a potent power producer—this heavy-duty, four-stroke cycle, overhead valve Diesel engine. With the exclusive patented combustion chamber used in all Waukesha Diesels you get unusual Diesel performance . . . clean burning with all standard "high speed Diesel fuels" . . . lively acceleration . . . high economy . . . easy starting . . . simpler maintenance. Send for Bulletin 1415.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
NEW YORK TULSA LOS ANGELES

WAUKESHA



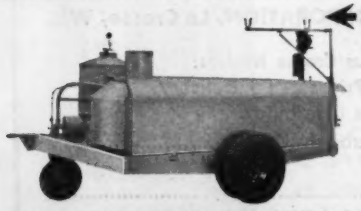
Diesel ENGINES

WAUKESHA Super-Duty Diesel (Model 6-WAKD)—six cylinder, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displ.

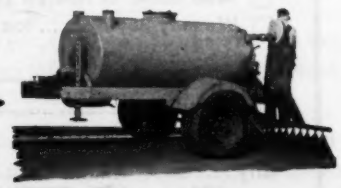
Sweep MORE MILES PER DOLLAR with 36" Dia. Brush on GRACE SWEEPERS

Large brush, chock full of fibre, and few moving parts reduce operation cost on Grace sweepers.

More ASPHALT HEATED Less Flue Repairs with RAPID-FIRE CIRCULATING HEATER for Tank Cars



The RAPIDSPRAY MAINTENANCE DISTRIBUTOR Vacuum Cleans *both* Spraybar and Handspray and has other time-saving features.



W. E. GRACE MFG. COMPANY
6003 Lamar Street Dallas, Texas

Clyde builders' towers have platform or bucket speeds of 178 fpm. They are assembled on the ground, cables are reeved, and the towers are raised to operating position by their own hoists.

Self-Raising Towers Lift 1 Ton 100 Feet

Portable builders' towers manufactured by Clyde Iron Works, Inc., Duluth 1, Minn., are available in three models: LPBT, PBT, and HPBT. They have overall heights of 30, 40, and 40 feet respectively, and may be extended with 10-foot sections to 40, 70, and 100 feet. The smaller models have a platform load capacity of 2,000 pounds, or can handle a ½-yard bucket of concrete. The platform load on the heavier model may be increased to 2,500 pounds. The elevator platform on all models is 5½ x 6½ feet, and line speeds are 77, 160, and 178 fpm, respectively.

The towers can be erected easily and safely, the company explains. Units are assembled on the ground, cables are reeved, and the tower is raised to operating position by its own hoist. No outside equipment is necessary. Spring-loaded shoes grip the side members of the tower to prevent the load from falling in case of cable failure. Outriggers are furnished with the larger models to provide additional stability.

A towered derrick boom may be attached to any of the models to increase its usefulness in hoisting beams, timbers, or other materials that cannot be placed on the elevator platform. The boom has a capacity of 2,000 pounds and has a 150-degree swing to permit loads to be picked up directly from a truck and deposited on the building. Double-drum hoists are required when the boom is in use. Trailer wheels for towing may also be obtained.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 158.

Engine Service Tool

A new tool has been developed for pulling the precombustion cup easily and quickly on International Harvester diesel engines. Owatonna Tool Co., 381 N. Cedar St., Owatonna, Minn., makes the Pre-Cup puller.

The five forcing screws in the set are of the correct diameter and are angled accurately to fit the Pre-Cup hole from which the pull is made, the company explains. Guide collars, which fit in to the Pre-Cup over the forcing screw, center the screw and prevent it from coming out when the cup is pulled.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 63.

Eutectic Promotions

Several field-force promotions have been made by Eutectic Welding Alloys Corp., New York City. Heading the list is the appointment of Don Rasmussen as Western Sales Supervisor. Other advances are Herman Greif and Daniel Wetmore to Regional Managers; Hugh Hurley and Roy Waldrop to Assistant Regional Managers; and Don Garrett, Lee Wade, and Alex Frederick to District Managers.

Troughed Belt Conveyors

Literature describing 18 and 24-inch troughed belt conveyors may be obtained from the Fairfield Engineering Co., Marion, Ohio. These conveyors are designed to handle sand, gravel, crushed stone, cinders, limestone, and other loose bulk materials. The Model 609, an 18-inch-belt conveyor, is built in standard lengths of 25, 30, 35, and 40 feet. The Model 608, with a 24-inch belt, is available in 25, 30, 35, and 40-foot lengths. The circulars explain that these models may be powered by electric motors or gasoline engines. They illustrate each unit and include principal dimensions and condensed specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 5.

PUT A MERCURY CLUTCH ON THE JOB

A Mercury Automatic Clutch makes starting easier and prevents stalling on a Cement Floor Finishing Machine.

INSURE LOAD-FREE STARTING AND IDLING

If your construction equipment and machinery is powered by a gasoline engine, insure its trouble-free performance at all times by installing a Mercury Automatic Clutch between the engine and the load. The engine starts easily, picks up the load smoothly, and does not stall when idling or when overloaded.

For all original equipment using gasoline engines . . . or electric motors . . . investigate the advantages of a Mercury Automatic Clutch. Easily installed on jobs in the field, in most cases. Write for Catalog 269-D.

MERCURY CLUTCH DIVISION

AUTOMATIC STEEL PRODUCTS INC. · CANTON 6 · OHIO

keep costs down

with CP equipment

CP-20 Sump Pump operates from a 60 c.f.m. compressor. At 40 pounds pressure against a 15-foot head, its capacity is 200 gallons per minute. Operating from a 105 c.f.m. compressor at 80 pounds pressure against a 50-foot head, its capacity is 225 gallons per minute.

It is a single-stage centrifugal pump that requires no priming – starts pumping instantly when air is turned on and the unit lowered into water. For full details write for SP-3017.

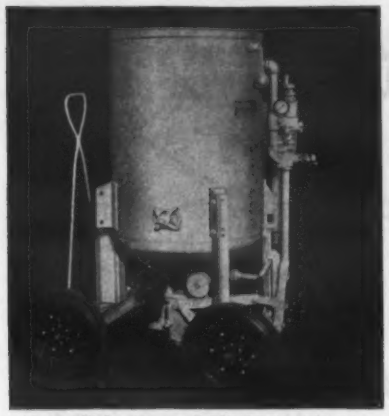
New CP-387 Triplex Backfill Tamper – three CP Tampers on a Gunderson-Taylor mounting – enables one man to do the work of four single tampers . . . faster and with more uniformity. Handles higher lifts than single tampers, so that greater thickness of fill can be compacted to specifications.

The Triplex walks easily over the fill. Wheelbarrow type handles make the 140-pound unit easy to guide; smooth tamping action of the three tampers makes unit easy to hold.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



Ruemelin's new sand-blast generator removes dust, scale, and old paint from steel. The maximum capacity of the unit is 1,000 pounds.

A Sand-Blast Unit For Cleaning Steel

A new sand-blast generator adaptable to bridge maintenance work has been announced by Ruemelin Mfg. Co., 386 N. Palmer St., Milwaukee, Wis. The high-speed blast nozzle is designed to remove rust, scale, and old paint quickly, providing a clean metal surface for application of primer or finish coats of paint. The generator is mounted on four pneumatic-tired wheels with the front wheels on a swivel axle equipped with a drawbar handle. The unit has a maximum capacity of 1,000 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 102.

Fastening Devices

Fastening devices in 66 sizes to meet popular anchoring needs in floors, walls, and ceilings are made by Holub Industries, Inc., Sycamore, Ill. Toggle bolts are available in three styles: one spring-wing and two one-piece wing tumble types. Each style comes in several screw thread sizes, ranging from ⅛ x 2 inches up to ½ x 6 inches, in 31 different screw lengths.

Machine screw lead anchors are available in 10 sizes ranging from screw thread size 6-32 to ¾-10. These machine screw anchors, or expanding nuts, the company points out, are the reverse of expansion bolts, since the nut anchors into the hole instead of the bolt. A metal threaded cone locks firmly into a lead sleeve as one unit.

Expansion bolts are available as a complete unit including a taper-headed bolt, lead sleeve, metal cone, and square or hexagonal nut. They are made in 4 screw thread sizes, ranging from $\frac{3}{16}$ x 1 inch to ½ x 8 inches, in 25 various bolt lengths.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 151.

Rough Terrain Is Air Compressor's Dish

A special 500-cubic-foot pipe-line model Blue Brute portable air compressor is now available, according to an announcement by Worthington Pump & Machinery Corp., Construction Equipment Division, Holyoke, Mass. With a standard engine and compressor unit mounted on pneumatic tires, it is designed to operate in rough terrain and on unusually steep inclines. It is built to give continuous performance under the unfavorable dusty conditions encountered in pipe-line construction, the company says. It is equipped with a special oil-bath air cleaner, a steep-angle oil sump, and a readily accessible heavy-duty replaceable cartridge oil filter.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 62.

Guide to Hard-Facing

A new 40-page manual on hard-facing has been prepared by the Haynes Stellite Division, Union Carbide & Carbon Corp., 725 S. Lindsay St., Kokomo, Ind. The booklet, "Haynes Alloys—Hard-Facing Manual", tells the complete story of hard-facing. It tells how to select the proper alloy and which welding process to use; and it gives simple step-by-step instructions for applying the various rods by both the oxyacetylene and metallic-arc welding processes.

It gives information on the properties and available sizes of 12 Haynes hard-facing materials. It lists construction and industrial applications and recommends the proper rod for each. The booklet is designed to be a helpful guide for all those interested in prolonging the life of parts and equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 108.

Structural-Steel Booklet

A 64-page booklet called "Steel Insures Strength and Security" describes in picture-story form the properties and applications of structural steel. It was prepared by the American Institute of Steel Construction, Inc., 101 Park Ave., New York 17, N. Y.

The twelve principal features of steel construction are cited and exampled in text and pictures: its strength, uniformity, endurance, toughness, adaptability, versatility, fire safety, compactness, erection-speed, salvage value, economy, and the service of its producers. Additional information is given on the history and organization of the AISC, its purpose, research, and publications.

This literature may be obtained from the Institute, or by using the Request Card at page 16. Circle No. 6.

ROETH CONCRETE VIBRATOR

MOUNTED ON WHEELBARROW CHASSIS

Model 1—6 hp., 6000-7500 rpm
Model 2—4 hp., 5500-6500 rpm

Complete unit consists of engine mounted on wheelbarrow chassis, 21 feet of flexible shafting (three 7-foot sections) and vibrator head 2"x22", 2½"x16" or 3"x16". *Write for circular.*

ROETH VIBRATOR COMPANY, 1737 Farragut Avenue, Chicago, Illinois

"Standard of Quality"...
FOR EXTRA DURABILITY AND SAFETY

"ALLGOOD CORD" AIR HOSE

For Manifold and Caisson Service

"ALLGOOD CORD" is especially built to assure constant pressure and greatest safety on main lines to wagons, jumbos, caissons and other heavy duty air equipment. Kinkproof construction, with highest resistance to continuous abrasive wear and damage from falling rock, tools, timbers.

A Goodall "Standard of Quality" product, backed by years of outstanding performance to contractors on bridge, dam and tunnel work. Sizes 1½" to 4", in maximum lengths of 50 feet.

Contact Our Nearest Branch for Details and Prices

GOODALL RUBBER COMPANY

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Route Gets 10 Miles Of 10-Inch Concrete

Illinois Highway Improvement Has 10-Inch Reinforced Slabs, 24 Feet Wide, on a 6-Inch Gravel Blanket

✦ HEAVILY traveled U. S. 40 through downstate Illinois is being improved for a 10-mile stretch in Cumberland County with a new 10-inch reinforced concrete pavement 24 feet wide, laid on a 6-inch gravel blanket. The job runs easterly from the Effingham county line, just east of Montrose, through the towns of Woodbury and Jewett, as far as 1 mile west of Greenup. The original 16-foot concrete pavement, laid back in 1920, was badly cracked and broken. Its surface was also much too narrow to accommodate the heavy truck traffic carried on this important Federal route.

Accordingly in 1948, the Illinois Division of Highways awarded a contract for grading a portion of this section to the R. V. McElroy Construction Co. of Decatur, Ill. The earth-work contract mainly covered a relocation north of the old road in the Woodbury and Jewett area. Around 663,000 cubic yards of hard clay excavation was involved in the project, which got under way in July, 1948. By the close of 1949 the dirt work on this contract was practically complete.

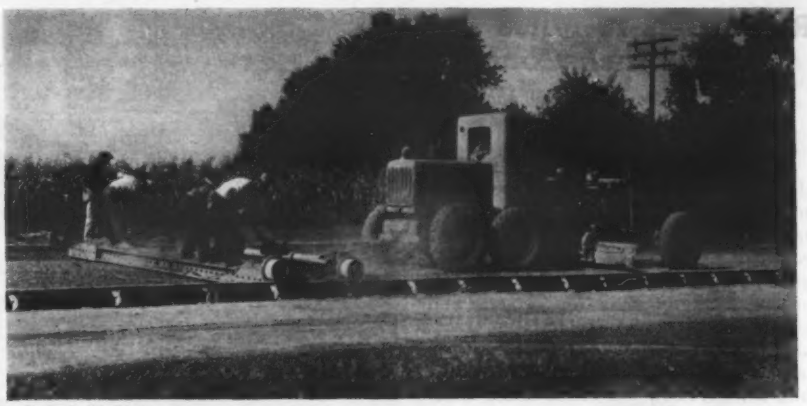
The remainder of the grading on this piece of road was left for inclusion in the 10-mile paving contract that the Illinois Division of Highways awarded to the Standard Paving Co. of Chicago on its low bid of $998,500. Standard began work in August, 1949, and pushed its earth-work operations at the western end of the project to permit the start of paving there during the last week of September. Concreting continued until cold weather forced the paver to halt. It was resumed in the spring, and the contract is expected to be completed before the end of this construction season.

Gravel Sub-Base

At the two ends of the project the new alignment corresponds pretty much with that of the old road; the new grade is higher, however. Consequently, the road was closed and traffic was detoured over an 18-mile route to the north. The light grading that was part of the paving contract included about 3 miles on the west end and 2 miles on the east where the old pavement was ripped out. According to the plan of operations, these two end sections were paved first, permitting traffic to use this much of the new road and the center section of the old portion, and thus using the long detour as short a time as possible. Paving of the new location was done last.

The old 7-8-7-inch non-reinforced concrete pavement was removed with little difficulty. An RPB paving breaker, working from a truck, broke up the slabs. A Caterpillar No. 12 motor grader undercut the shoulders along the edge of the pavement, permitting a D7 high-lift to get in and dig out the rubble and load it into trucks. The broken chunks of concrete were placed in the fills. The old pavement was removed only when it came under the new roadbed; otherwise it was left in place and used for haul roads as much as possible. Later this also was removed and disposed of by the contractor.

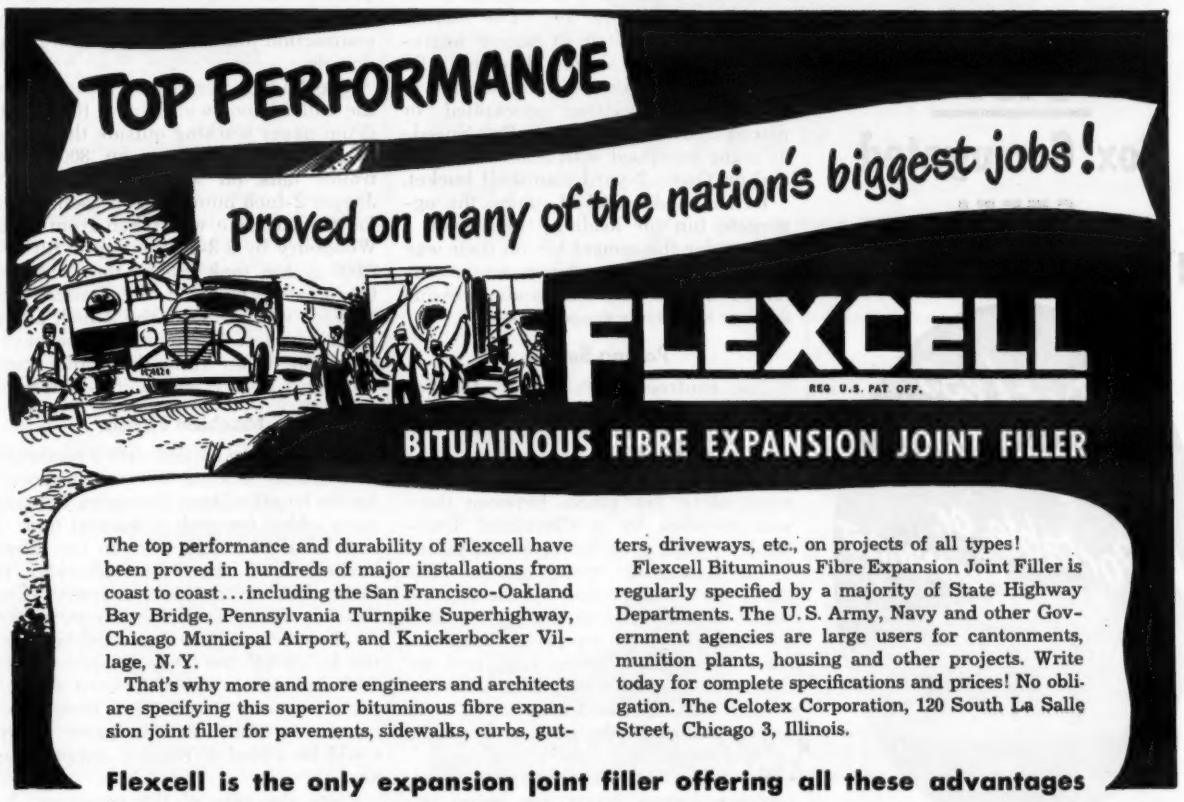
The rest of the grading in the sandy-clay and hardpan soil was handled by four Caterpillar scrapers—one at 20 yards and three at 15 yards—pulled by D8 tractors. The average haul was 600 feet. The material was spread in 6-inch lifts by a D7 dozer, compacted by sheepsfoot rollers, and shaped by a motor grader. After compaction by an Ingram 5-ton 3-wheel roller, the roadbed was ready to receive the 6-inch gravel blanket which was laid to a width of 26 feet, or one foot beyond the pavement on each side.



C. & E. M. Photo
A Cleveland Trailgrader pulled by a Caterpillar motor grader rectifies high or low spots between Heltzel forms on the U. S. 40 job in Illinois.

Granular material for the sub-base was obtained from a pit, an average 11-mile haul away from the job. Barthelemey & Dillier Co. of Casey, Ill., did the hauling with a fleet of 20 trucks. Many of these units had 5-yard bodies and pulled trailers that held an additional 4 yards. The gravel was end-dumped and then spread by a D7 dozer and compacted. The Ingram 5-ton 3-wheel roller was used for final compaction of the subgrade.

(Continued on next page)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Flexcell is the only expansion joint filler offering all these advantages

1 NON-EXTRUDING. Millions of tiny air cells permit compression without displacement. Will not extrude under pressure by adjacent concrete slabs.

2 RESILIENT. Re-expands on release of compression, preventing open joint crevices. Flexcell's "recovery" under severe laboratory tests is over 70%.

3 COMPRESSIBLE. Compresses uniformly. No hard cross-grain, knots, or other defects. Provides 50% compression under loads up to 750 lbs. per square inch.

4 DURABLE. Proved by years of actual use in major installations all over the nation. Withstands severest service, extremes of heat and cold. Protected against termite and fungus attack by the exclusive patented Ferox® Process.

5 ADHERES FIRMLY. Its rough-textured surface grips and holds concrete more firmly. Keeps joints closed.

6 STAYS PUT. No possibility of any piece, splinter, or strip working loose and protruding above surface of slab, thus impeding or endangering passing traffic.

7 MOISTURE RESISTANT. Each of the long, tough Louisiana cane fibres in Flexcell is coated with a durable moisture-proofing compound by the exclusive Flexcell Process.

8 EASY WORKABILITY. Lightweight, easily cut with hand saw, readily stored, holds it shape indefinitely. Provides neat, finished joint with no trimming.

9 ALWAYS UNIFORM. Precise scientific control during manufacture assures uniformly high quality and dependability.

10 VERSATILE. Outstanding for work requiring special cutting, tapering, and fabricating. Unsurpassed for concrete work above grade, around bridges, grade separations, overpasses, and concrete building construction. Replaces products of much greater cost.

11 ECONOMICAL. Measured in terms of performance and service, Flexcell is indisputably the most economical product of its type on the market.

12 QUICKLY AVAILABLE. Flexcell distributors conveniently located from coast to coast are kept supplied with ample stocks at all times. These distributors are equipped to handle all requirements, special sizes, cutting, punching—promptly, without delay!

SPECIFICATION APPROVALS Flexcell® Bituminous Fibre Expansion Joint Filler meets the requirements of: American Association of State Highway Officials Standard Specification M 59-42. Federal Specification HH-F-334. American Society for Testing Materials Tentative Revisions of Standard Specifications for Preformed Expansion Joint Filler D 544-48.

FLEXCELL
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BITUMINOUS FIBRE EXPANSION JOINT FILLER
The Celotex Corporation, Chicago 3, Illinois

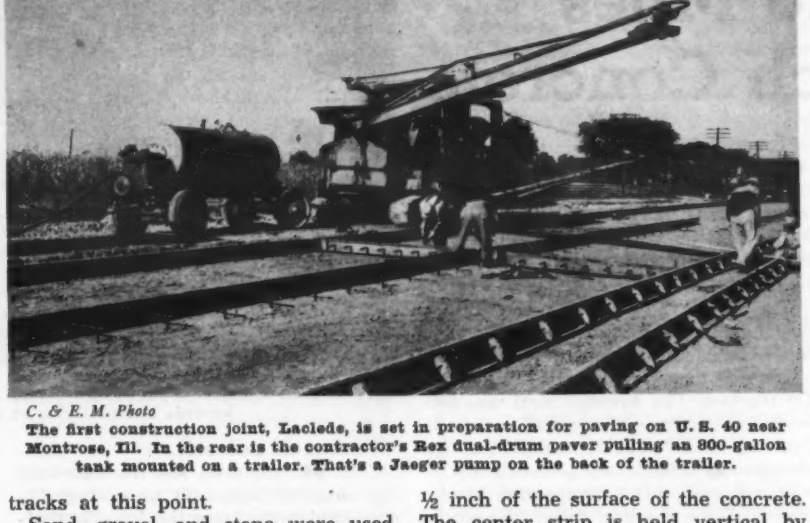
Route Gets 10 Miles Of 10-Inch Concrete

(*Continued from preceding page*)

Batch Plant

A concrete batch plant was set up at the west end of the job, immediately south of the highway and the main-line tracks of the Pennsylvania Railroad's route to St. Louis. A long siding track gave ample room for cars with materials of construction. Bins for cement and aggregate were alongside the track, about ¼ mile apart. Cement was stored in a new Johnson 380-barrel twin-batch bin, while a Blaw-Knox 180-ton 3-compartment bin held the aggregate.

Marquette air-entrained bulk cement was shipped to the job in cars from LaSalle, Ill., and was unloaded by a worm gear under the siding track connecting to an enclosed elevator discharging into the bin. A planked ramp was built under the bin for the trucks to use when loading. This protected an important pipe line that paralleled the tracks at this point.



C. & E. M. Photo

The first construction joint, Laclede, is set in preparation for paving on U. S. 40 near Montrose, Ill. In the rear is the contractor's Rex dual-drum paver pulling an 800-gallon tank mounted on a trailer. That's a Jaeger pump on the back of the trailer.

Sand, gravel, and stone were used for aggregate in the mix. Sand and 1½-inch gravel were supplied by the Terre Haute Sand & Gravel Co. of Terre Haute, Ind., while 2½-inch-down stone came from the Ohio & Indiana Stone Co. at Greencastle, Ind. The storage track accommodated 40 cars of aggregate which were shifted about by a D8 tractor and cable. The material was unloaded and either stockpiled or placed in the bin by a Link-Belt Speeder crane equipped with a 55-foot boom and an Owen 2-yard clamshell bucket.

Batch trucks backed under the aggregate bin for loading, then made a loop under the cement bin on their way to the paver. A watchman was maintained at the railroad grade crossing during the paving operations.

Paving Set-Up

The contractor brought to the job 4,000 linear feet of Heltzel forms, and usually kept most of these lined and graded ahead of the paver. They were set by hand 24 feet apart, and excess material or low places between them was rectified by a Cleveland Trail-grader rolling over the forms and pulled by a Caterpillar motor grader. The grade was again rolled by the Ingram roller, and given a final check with a Cleveland scratch template. Then the steel longitudinal center joint and the transverse contraction joints were installed. All joints and reinforcing steel were supplied by the Laclede Steel Co. of St. Louis.

No expansion joints were specified, but contraction joints are being installed every 100 feet. Both the contraction and center-line joints consist of 18-gage-steel strips that come within ½ inch of the surface of the concrete. The center strip is held vertical by steel pins driven into the subgrade. It has a keyway at center depth, through which go ⅝ x 30-inch rods on 30-inch centers across the longitudinal joint. The rods are supported at the ends by pins. At 13½-inch centers through the contraction joints are 1 x 18-inch round dowels.

The 10-inch uniform slabs are paved the full 24-foot width by a Rex dual-drum paver working outside the forms. The paver pulls along an 800-gallon trailer tank on which is mounted a Jaeger 2-inch pump. Last season, water for the concrete was taken from Lake Woodbury by a 3-inch pump to fill two 2,000-gallon tank trucks that supplied the smaller tank on the trailer. The transfer was made by the 2-inch pump on the trailer. The pump on the paver drew the water from the trailer tank through a 50-foot length of 2-inch hose.

Machine Finish

Batches were hauled with a minimum of 8 trucks holding two batches each. As the length of haul increased, 2 trucks were added for each additional mile of haul until 24 trucks were in use. They backed down the 9-foot shoulder to dump their contents into the paver skip. Batches were mixed one minute in the 34-E paver and then deposited between the forms off the 40-foot paver boom. Although air-entrained cement is used, the paver was fitted with a Darex dispenser so that air-entraining agent could be added if regular cement was used.

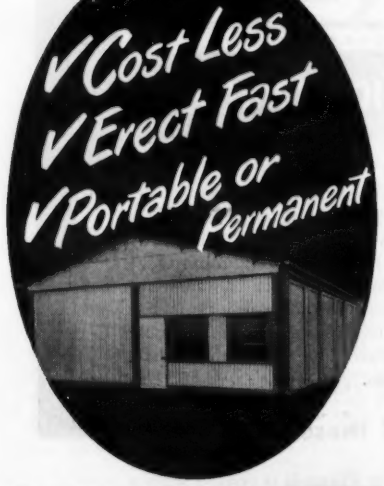
From the side of the paver an A-frame boom was attached overhanging the forms. To it was hooked a strike-off for leveling the concrete at the steel depth, 2½ inches below the surface. After the 78-pound mesh was laid, more concrete was added in front of a Jaeger-Lakewood 2-screed finishing machine. Three vibrators were mounted on the finisher—one at the center and the other two at the sides—to vibrate the longitudinal joint and along the forms. The vibrators were on hinges for easy raising and lowering. Steel caps cover the tops of the contraction joints so that they do not get filled with concrete.

Following the transverse screeding, the surface of the concrete was screeded longitudinally by a Koehring Longitudinal Finisher. Finishers then floated it by hand, checked for evenness with straight-edges, and removed the caps from the contraction joints when the concrete had set slightly. Joints were edged, then the concrete was sprinkled lightly with a fine spray of water and covered with Sisalkraft paper for curing. The paper was removed after 72 hours. The ½-inch V-type contraction

(*Concluded on next page*)

USF

Box Corrugated STEEL UTILITY BUILDING



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WRITE for complete data or quotation.

USF United Steel Fabricators, Inc. Wooster, Ohio

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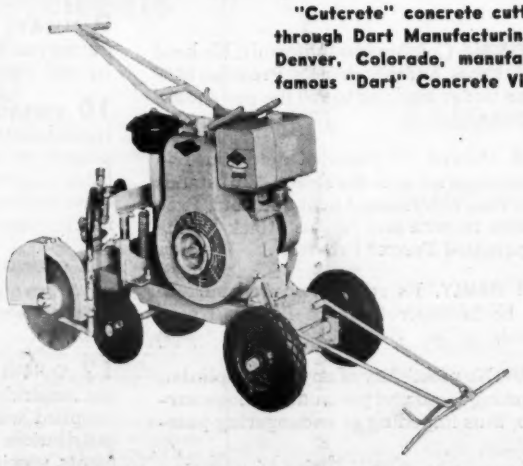

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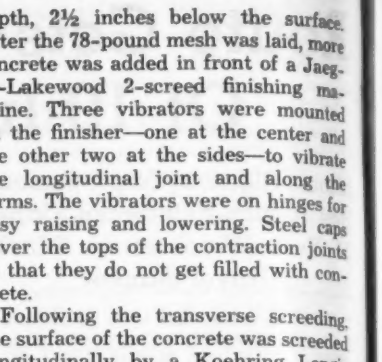

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Also write for information on The New SMITH MODEL 70-P COMPRESSOR

SMITH Air Compressors

Gordon Smith & Co. Bowling Green, Ky.

483 College Street

joints were later filled with asphalt. After the job is finished, state forces will do the center striping. During the 10-hour work day, an average of 1,000 linear feet of pavement was maintained.

The finished 24-foot pavement has a 1½-inch center crown. The 9-foot shoulders have a total slope of 8¼ inches. Cut sections have a ditch 2 feet wide x 3 feet deep, with mostly 3 to 1 backslopes. Fill slopes are generally 4 to 1.

Quantities and Personnel

The 10-mile project was divided into three sections, the major items totaling up as follows:

Earth excavation	186,309 cu. yds.
Borrow excavation	40,770 cu. yds.
Granular borrow, gravel blanket	38,200 cu. yds.
Concrete pavement, 10-inch uniform	140,349 sq. yds.
Reinforcing fabric	140,349 sq. yds.
Seeding	178.0 acres
Mulch cover	29.7 acres

The Standard Paving Co. employed an average force of 65 men on its contract. Joe Zero is General Superintendent; Armen G. Avedisian is Construction Engineer; Don Dashney is Grading Superintendent; and Norman "Slim" Walters is Paving Superintendent.

For the Illinois Division of Highways, William D. Wooley is Resident Engineer. The project is in District 5 of which G. A. Somerville is District Engineer with headquarters at Paris. The Division of Highways is headed by C. M. Hathaway, Chief Highway Engineer.

Electronic Calculators Cut Design Time and Cost

Are design engineers taking full advantage of high-speed automatic electronic calculating machines for design, research, and development work? Probably not as much as they should, though the majority of technical problems which confront engineering and research offices require some type of numerical analysis.

Regardless of the form in which these numerical problems arise, whether they are in the field of engineering or science, their solution can contain only basic arithmetical operations of addition, subtraction, multiplication, and division. These operations can be performed automatically at high speed on standard electronic calculating machines.

A new 22-page booklet, "Fundamentals of Electronic Calculation", prepared by International Business Machines Corp., 590 Madison Ave., New York, N. Y., outlines the application of electronic calculators—and the technical services offered by the company—to meet engineering needs. It highlights calculations performed by the IBM Technical Computing Bureau for the complete numerical analysis of the behavior of piles when struck by a pile-driving hammer. The IBM method of formula evaluation provides, in this case, precise data for the expectation of pile behavior under any specified conditions. The discussion of the problem and its solution was prepared by Edward A. Smith, Chief Mechanical Engineer of the Raymond Concrete Pile Co., New York City, and offers an excellent example of how an economical mathematical analysis of the characteristics of a given physical situation can replace the expensive trial-and-error method of solving a problem.

The booklet indicates a diversity of other problems which can be fed to electrical computing machines: for example, the solution of eight systems of twenty linear, simultaneous, inhomogeneous equations for structural analysis; conversion of 10,000 rectangular coordinates to polar coordinates; solution of 33,000 quadratic equations to determine the line-of-center distance between pulleys of different diameter attached by belts of varying lengths; and similar problems in which observational data are accumulated and must be analyzed before the results of a study can be evaluated.

The machines may be used for solving differential equations, harmonic analysis, curve fitting in the sense of least squares, and solving simultaneous equations or numerical integration. The booklet also explains how standard mathematical formulae or general accounting systems may be translated into terms that are usable for computation by the electronic calculator.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 97.

New Pipe Locator And Leak Detector

The Dualtronic, a combined pipe locator and leak detector, has been developed by The Goldak Co., 1500 W. Glenoaks Blvd., Glendale, Calif., to meet demand for a dual-purpose electronic instrument. Adapted for both pipe locating and leak detecting, the Dualtronic is said to be easy to handle, light in weight, and inexpensive to operate. By doing the work of two instruments, it cuts down labor and increases job speed and efficiency.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 49.

Engineering Properties Of Nickel Alloys Given

Two new technical bulletins on the properties of high-nickel alloys have been issued by The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y. Both have 24 pages and contain charts, tables on compositions and properties, working instructions, and other information of a technical nature.

Technical Bulletin T-7 is entitled "Engineering Properties of Inconel". It also covers Inconel X, one of the newer age-hardenable Inco nickel alloys. The second booklet, "Technical Bulletin T-9", deals with the engineering properties of K Monel and KR Monel.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 131.

Pipe Sales Engineer, N. Y.

Brendan P. O'Hara is a new Sales Engineer at the New York office of Universal Concrete Pipe Co., 420 Lexington Ave., New York City. A Cornell graduate, he was formerly associated with Universal Atlas Cement Corp.

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Portable Elevators

Basic units of Waco portable elevators, manufactured by Wilson-Albrecht Co., Inc., 3565 Wooddale Ave., Minneapolis, Minn., consist of an electric-welded steel base section, upright steel carriage guides, and a single-drum hoisting unit. Easily attached extension sections are available in 10-foot lengths. Platforms travel entirely clear of the guides so that loads can extend over the platform sides, if necessary, with no interference. The elevators are available in three models with lifting capacities of 1,000, 1,700, and 2,500 pounds.

The elevators are erected by hoisting solid one-piece upright sections into place by means of the gin pole, with power and hoisting rope on the drum. The carriage is fitted with rollers that travel in the guide channels to eliminate friction and take the wear of vertical travel. A quick gravity return is under the operator's positive control at all times.

Engines used on Waco material-handling elevators are fully enclosed in steel housings and are equipped with governors, magnetos, air cleaners, and carburetors. The two smaller models are furnished with either air-cooled or water-cooled engines. The elevator base and frame is made of structural steel. The carriage guides are made of 4-inch I-beams with angle cross pieces and braces. All upright sections are electrically welded in one solid piece. A two-wheel trailer attachment, including wheels, axles, towbar, and tires, is available for transporting the elevator. A self-dumping concrete bucket can also be furnished.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 8.

Concrete Drill Bits

A new line of concrete drill bits to supplement Koncrete Kore drills has been announced by Tilden Tool Mfg. Co., 1995 N. Fair Oaks, Pasadena 3, Calif. The drills are of a new "centerless" design and are furnished in a range of sizes from 3/16 to 7/16 inch. Because there is no center point to act as a pivot and retard cutting, the new drills penetrate concrete at high speeds with 80 per cent less pressure than is required for ordinary drills of the same diameters, the company claims. The drill bits can be used with ordinary electric drills at speeds of from 500 to 1,200 rpm.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 28.

Rubber Paving Surfaces

A bulletin describing briefly the use of natural, synthetic, and processed rubber for paving surfaces has been prepared by the Rub-R-Road Division of the Firestone Tire & Rubber Co., Akron 17, Ohio. It sketches the background of Firestone's work in rubber paving, not only for streets and highways, but for playgrounds, tennis courts, parking lots, and airport runways. It tells the early history of Rub-R-Road construction and points out that equipment ordinarily used to apply regular surface wear coats may also be used for this purpose. The folder lists increased durability, resistence to frost damage, and improved traction as features of the new type of construction. Current Rub-R-Road projects are illustrated and described.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 83.

Truck-Mounted Hole Digger

Literature describing the Tel-E-Lect truck-mounted pole-hole digger is available from Tel-E-Lect Products, Inc., 1000 Minnetonka Blvd., Minneapolis 16, Minn. This unit, with interchangeable 8, 9, 12, 16, and 20-inch augers, may be front or rear-mounted, and may be used to dig holes up to 8 feet deep. The Tel-E-Lect, the company points out, will operate on any derrick and winch-equipped truck.

The literature illustrates the unit in operation both on smooth road surfaces and rugged terrain. It explains exactly how the Tel-E-Lect digger works and provides full specifications on the unit. It also points out its applications for both large and small operators. Complete information and prices are given for the various models.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 145.

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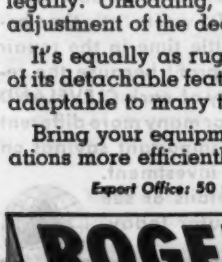
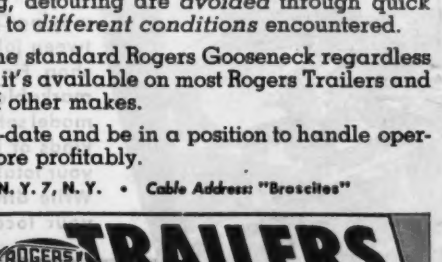


← STOOPS TO CLEAR LOW OVERHEAD OBSTRUCTIONS

← RAISES ITS DECK TO CLEAR HIGH BANKED CROSSINGS



Patents Pending

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ROGERS BROTHERS CORPORATION, 108 Orchard St., ALBION, PA.

Portrait in Print

By BILL QUIRK

George R. Dempster—Builder Turned Dealer, Inventor, and Manufacturer

+ AFTER George R. Dempster graduated from Girls High School, Knoxville, Tenn., back in 1906, prospective employers scanning his application would mutter to themselves in bewilderment, "What manner of fellow is this?" The answer was simple. In those days Knoxville did not as yet have a central high school, and as so few boys were seeking a secondary education, those few were forced to attend Girls High.

But the question, "What manner of fellow is this?" might well be asked about George R. Dempster in the succeeding phases of his life. For he has been a steam-shovel operator; contractor; equipment dealer; inventor; writer; lecturer; public servant, both city and state; business man; and manufacturer. A 14-building plant, with ½-mile railroad frontage, spreading out over 26 acres on a Knoxville industrial site, suggests that George R., President of Dempster Brothers, Inc., has kept himself busy since he walked out of Girls High 44 years ago with a diploma under his arm.

Now 62, Dempster has been in business 37 years in Knoxville. He is a neat-looking man of average height and build, bald as an American eagle. He is an easy-to-meet person, keen, alert, yet possessing a pleasantly relaxed manner not usually found in busy executives. Two telephones in his private office ring almost continuously. Dempster, however, has the uncanny facility of carrying on conversations over both instruments at the same time, while still not neglecting a caller in his office. All this is done without a trace of tension or pressure. Maybe that inviting-looking couch in the office holds the secret of Dempster's calm serenity, for he has the wise habit of shrugging off phone calls, visitors, and business affairs to take a short nap during the afternoon. After a brief siesta he is ready to go again at the same controlled pace for the rest of the day.

The company he heads is a family affair that includes four brothers and two sisters. Dempster's Scottish-born father, a miller by trade, came to this country in the '70's and married an Irish immigrant girl in New York. They made their way over the great Appalachian mountain range to Knoxville where they settled down and raised their family of eleven. Five of the children, a boy and four girls, have since died.

To Panama

George, spaced chronologically about the middle of the children, was no more than a fair scholar but had a marked bent toward mechanics. From school he went to work for W. J. Oliver, a Knoxville contractor and at that time one of the biggest in the country, specializing in railroad and heavy construction. With his flair for things mechanical, young Dempster in a short while was operating a steam shovel. The big construction job of that day, and of the first half of the twentieth century for that matter, was the Panama Canal. Oliver submitted a bid for a contract to dig a part of the canal, while his young shovel operator, afire with the enthusiasm of far-off romantic places, pictured himself helping construct the giant canal.

When the Government, rejecting all bids, decided to build the canal iself, the let-down for the dreaming Knoxville lad was intense, but not long-lasting. The Government needed shovel operators too, so off to Panama went George, then 19, accompanied by his brother Tom, two years his junior, and an older sister who was likewise adventure-minded. Under George's guidance, Tom, only 17, had also become a first-class shovel operator. But their extreme youth counted against the Dempster boys until George, to satisfy the record, added four years to Tom's and his age, making them "veteran" shovel men of 21 and 23.

"My sister took a dim view of this age juggling," Dempster recalled with a laugh. "To keep the dates straight, I suggested that she tack on four years too." Then with a classic understatement he continued, "But women dislike adding to their age, and she would have none of this. So we kept my sister's age right where it was. This made us twins, and as twins we were known throughout Panama."

From 1907 until 1912 the Dempster boys dug the canal as part of the first crew working from the Pacific side in the Miraflores lock area. "Tom was the youngest shovel man on the job," George related, "and there were 101 shovels working on the canal. All but one were railroad-type shovels that could swing only 180 degrees, and needed heavy outriggers to keep from tipping over as they worked. The exception was a lone ⅝-cubic-yard Thew shovel that revolved a full circle, and was the forerunner of the present-day speedy excavators of over 40-yard capacity."

Fever and Romance

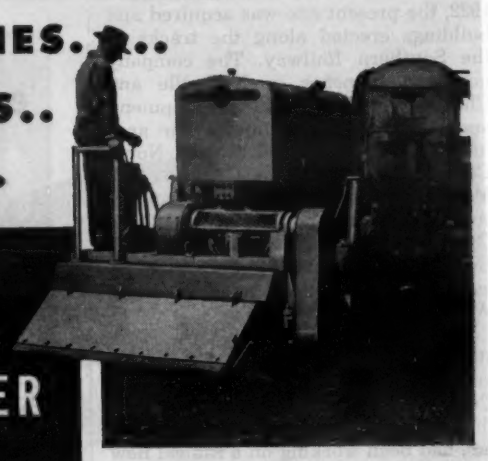
After two years in the tropics, the climate and the water caught up with George and he became ill with malaria and typhoid. Desperately sick he returned home, recovered, and fell in love with Frances Seymour, 19, of Knoxville. Her parents wanted Frances, youngest of the family, to wait awhile before getting married. The young couple thought otherwise and eloped to Panama. George made a good living in his old capacity as shovel operator, and later also worked as a locomotive engineer. By 1912 the major part of the canal excavation was over, so George Dempster returned with his wife to the states. Tom stayed a year longer, and

(Continued on next page)

C. & E. M. Photo

Now 62, George R. Dempster has been in business 37 years in Knoxville, Tenn. The equipment distributing-manufacturing company he heads, Dempster Bros., Inc., is a family affair that includes 4 brothers and 2 sisters.

SCARIFIES...
PULVERIZES..
MIXES...



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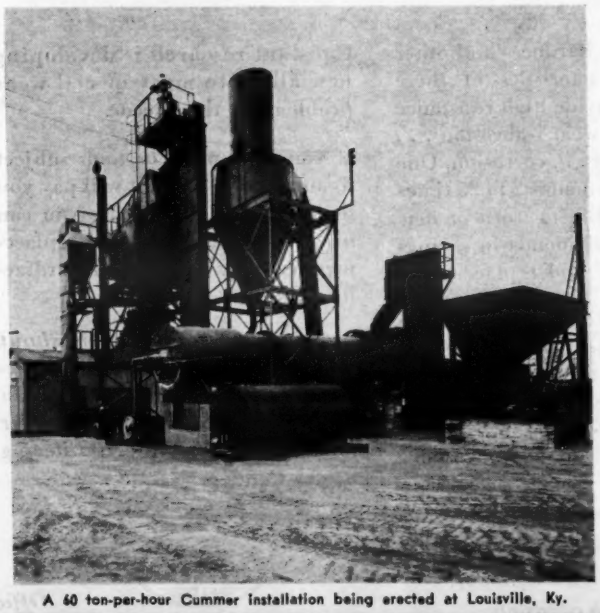

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Literature on request

THE F. D. CUMMER & SON COMPANY
Builder of fine asphalt plants
Cleveland 15, Ohio USA

George R. Dempster, A Versatile Fellow

(*Continued from preceding page*)

then he too came home.

With this valuable experience in heavy construction, George Dempster was sought after by several contractors. After a turn as superintendent he went into the contracting business with his brothers, in 1913, in the Dempster Construction Co. headquartered in Knoxville. Jobs were mainly railroad and heavy construction, with roads, dams, and bridges undertaken later as highway programs gradually got under way throughout the country.

Equipment Distributor

A few years later in 1916, Dempster added a Machinery Division to his construction activities. As an equipment distributor he began by selling Erie steam shovels that ran on traction steel wheels before crawlers were known. At first, repairs were done in five different shops around Knoxville until, in 1922, the present site was acquired and buildings erected along the tracks of the Southern Railway. The company now has branches in Nashville and Chattanooga for handling equipment, and serves, besides Tennessee, an area including portions of Kentucky, North Carolina, Virginia, and Georgia. The Machinery Division carries products by such manufacturers as Anthony, Bros, Cyclotherm, Huber, LeTourneau, Link-Belt, New Holland, Ransome, Rochester, Rome, South Bend, Truckstell, Worthington, and others.

The great depression hit the construction industry hard in Tennessee, and by 1933 the Dempster Construction Co. had little work to keep it busy. But the ingenious Dempster, with his brothers, had been working on a radical new method of collecting trash and rubbish to serve municipalities, and came up with what they called the Dempster Dumpster System. It consists primarily of a single hoisting unit mounted on a truck for handling detachable buckets which may be considered the body of the truck. These closed Dumpster buckets, bodies, or cans, as they are variously called, range in size from 1½ to 21-cubic-yard capacity. The Dempster-Dumpster, operated hydraulically, can pick up a loaded bucket in 30 seconds for hauling it away.

Tail That Wagged the Dog

The new product caught on practically at once, and is now marketed all over the world. It was soon adapted for many uses other than rubbish collection. The Dempsters hit the jackpot with their Dumpster, and retired from a contracting business that had fallen on lean years. Dempster Brothers, Inc., was then organized as a holding company, including a Machinery Division handling construction equipment, and a Manufacturing Division turning out Dumpsters to meet a growing popular demand.

Before long the Manufacturing Division evolved a new piece of equipment called the Dempster-Balester, a hydraulic press machine that bales scrap metal. It is used mainly in industrial plants. Last year the latest Dempster brain child, the Dempster Diggster,

C. & E. M. Photo

George R. Dempster has the knack, rare among busy executives, of working at a controlled pace without a hint of tension or pressure—even taking time to lean back and chat easily with a caller.

came into being. This machine with the euphonious title, also using the final S-T-E-R letters of its inventor's name, is a revolutionary development in a hydraulic shovel and front-end loader. Mounted either on a crawler tractor or a truck with top road speed of 30 mph, this unit employs a bucket from 1 to 3 cubic yards in capacity. Its crowd, hoist, and steering operations are hydraulically powered.

The Dempster enterprises now employ about 325 persons at the Knoxville plant. Only this year a new $100,000 building was constructed, the fourteenth on the site. They range downward in size from an 85 x 200-foot structure where the Dumpsters are manufactured. Welding is the principal skilled craft employed at the plant, and George Dempster takes great pride in the workmanship of his men. "They are all local people", he emphasized. "Most of them have been with us many years. During the war we built 15,000 pontoons for the U. S. Navy, and not a single one was rejected. That job demanded the best of welding, and we turned out the work as the Navy wanted it."

Many of these welders, while unlettered and unschooled, are expert craftsmen and are well paid for their skill. One worker with a tidy $10,000 in his bank account signs the payroll with an X. George Dempster knows each of his employees personally, addresses them by name or with a friendly wave of the hand and a quiet smile as he goes through the plant. A non-smoker and drinker himself, Dempster has a tolerant attitude to those not so inclined. A first-class layout man is among the latter. "He is one of our best," Dempster admitted, amused but perplexed, "despite the fact that he drinks lots of beer, and sometimes even something stronger than beer."

Dempster credits the growth of his company to the executive staff that Dempster Brothers, Inc., has assembled. Executive Vice President Thomas G. Shea, for instance, well known in manufacturing and equipment circles, has been with the firm over 30 years and has a reputation as a master salesman. Harry W. Jones, Chief Engineer,

(*Continued on next page*)

DAVEY COMPRESSORS

ONLY COMPRESSOR WITH PERMANENT PEAK EFFICIENCY LIFETIME VALVES

DAVEY COMPRESSOR CO. KENT, OHIO

extra service for your equipment when

"WEAR-RESISTED"

with AIRCO hardfacing alloys

Because of the hardness and other desirable characteristics of these alloys, they provide high resistance to all types of wear—abrasion . . . impact . . . heat . . . corrosion. One application often adds 2 to 25 times longer service life to *worn or new* parts . . . big dividends in savings of "down-time" and replacements.

There is an Airco alloy available for oxyacetylene flame or electric arc application to meet all types of wear conditions.

1. *Severe abrasion and medium impact*
2. *Shattering impact and abrasion*
3. *Severe impact and abrasion*
4. *Sliding abrasion and impact*
5. *Extreme earth abrasion*
6. *Corrosion and heat*

Constant research is developing new alloys to meet special wear problems as they occur.

If you have parts or tools subject to any type of wear, it will pay you to investigate the savings you can make in maintenance and replacement costs by using Airco Hardfacing Alloys.

For further information about Airco's complete line of "wear-resistant" alloys, write your nearest Airco office or Authorized Dealer for a free copy of the Hardfacing Alloys Catalog.

More news about AIRCO products

FOR SEVERE IMPACT AND RESISTANCE TO ABRASION
Airco No. 388 Electrode

A shielded arc electrode sufficiently high in alloy content to produce a deposit bearing approximately 9% chrome and 0.9% carbon. This alloy content results in a weld metal deposit which is essentially martensitic.

Operators will find that the exceptionally fine arc action of Airco No. 388 increases both the speed and quality of their work.

FOR RESISTANCE TO EXTREME EARTH ABRASION
Airco Tungtube
Nos. 8, 10, 20, 30 and 40

These are fabricated rods of tungsten carbide particles encased in a steel sheath. The various Tungtube numbers indicate the screen size of the tungsten carbide particles contained within the tube. With its extreme hardness tungsten carbide ranks second only to the diamond in earth cutting efficiency. It is accepted as the standard means of cutting non-metallic substances; such as, coal, shale, and granite. It is recommended for core bits, fishtail bits, road plows, coal cutter knives, plow shares and similar equipment subjected to extreme earth abrasion.

CORROSION — ACID RESISTANT ALLOYS FOR WELDING HARDER GRADES OF ALUMINUM BRONZE
Airco Nos. 100, 116, 120, 125 and 130 Electrodes

For joining aluminum bronze or other metals and combinations of dissimilar metals—and for overlays on bearing surfaces, machine parts, dies, etc. The deposits made with these electrodes are corrosion and acid-resistant and will also retard wear from abrasion and impact.

AIRCO AIR REDUCTION
Offices in Principal Cities

also doubles as salesman and contact man when necessary. Other key personnel include M. B. Rutherford, Chief Auditor; John L. McFall, Purchasing Agent; and J. Goodloe Walden, energetic General Sales Manager, who spreads himself from Canada to Panama. Then of course, there are the second generation of Dempsters—Jack, Jim, Bob, Tom Jr., and George Jr.—who are learning everything about the business from the bottom up.

Public Servant

In addition to his activities in the construction industry, George Dempster has played a prominent part in civic affairs. He has served three terms as Knoxville's City Manager; was a member of the City Council last year; and has also been Commissioner of Taxation and Finance for the State of Tennessee. Good government is his hobby, which explains why a busy business man has repeatedly entered the political lists. He also serves on the Governor's Stream Pollution Study Commission and Control Board.

For his achievements while in public office, Knoxville is indebted in particular to George Dempster for its municipal gas plant and the Henley Street Bridge. Under Dempster's administration the city in 1945 purchased the Knoxville Gas Co. for $450,000. Its value is indicated by the fact that private interests have already tried to purchase it from the city for $2,000,000. Knoxville, however, is holding on to its gas plant, along with its municipally owned electric power and water systems.

The Henley Street Bridge in Knoxville, built in 1930 during Dempster's first term as City Manager, is a symbol of his far-sightedness. Despite heavy opposition, that broke out into public abuse, Dempster insisted on a 54-foot roadway instead of the 36 feet demanded by his opponents. Today, none can be found who will say that 54 feet is too wide for the bridge roadway.

A curious story, yet unfortunately one not uncommon to American public life, spins around the construction of that bridge. The night before bids were to be opened on the project, a contractor called Dempster offering him 10 per cent if his company got the work. The City Manager wasted no time in showing the man the door. When the various bids were compared the next day, that very concern was low bidder by just a few dollars. Dempster went before the city council and successfully persuaded that body not to give the contract to the low bidder. A lawsuit was threatened. Dempster came right back and promised to expose the contractor for attempting to bribe a public official. The suit was never pressed. Good government had shown it was not to be tampered with. A slogan on the wall of Dempster's office sums up his philosophy regarding public service—"A Poltician Thinks of the Next Election; A Statesman of the Next Generation".

Future Generations

Literally, the next generation of Dempsters has been well considered. George, together with brothers John, Tom, and Bob, who are active department heads in the firm, have a total of 11 children. Their grandchildren, the succeeding generation of Dempsters, currently number 14—12 girls and 2 boys.

C. & E. M. Photo

Hold tight, now! In front of a 10-yard Dempster-Dumpster, left to right: Thomas C. Dempster, Thomas C. Dempster, Jr.; Jack Dempster; George R. Dempster; John S. Dempster; Robert B. Dempster; Robert J. Dempster—and David Holmes.

"This big family is spread out pretty thin throughout the entire organization," George said smilingly, "but there is work for all. However, this 12 to 2 girl-boy ratio in the grandchildren is out of order. On my farm this year out of 25 calves I got 21 bulls and only 4 heifers." This paradoxical behavior of bovines and humans seemed beyond the ken of even a construction expert.

Dempster and his wife have three children, two girls and a boy. The girls are married, while son George, a bachelor, after five years service in the Army is studying at the University of Tennessee. Dempster has an apartment over his office at the Knoxville plant, but spends most of his time while away from business on his 300-acre cattle farm 8 miles out of town on the Maryville Pike. There he raises white-faced Herefords. He insists, nonetheless, that he is an agriculturist and not a farmer. "A farmer," says Dempster, "makes his money in the country and spends it in the city, while an agriculturist makes his money in the city and spends it in the country." Quite some difference.

Dempster's two older sisters live in

(Concluded on next page)

TRANSITS and LEVELS

HEADQUARTERS for REPAIRS—any make

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalog CE-08 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.

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EUCLID

STANDARD EQUIPMENT for OFF-THE-HIGHWAY HAULING JOBS!

Leading contractors and industrial users of heavy earth moving equipment have standardized on Euclids because they know from experience that "Eucs" increase profits and cut hauling costs. "Euclids sure do the job . . . actually cost less to own than any other hauling equipment," owners say.

Large capacity, dependable performance, and lower operating and maintenance costs have made Euclid the choice for off-the-highway hauling jobs. Designed for a wide range of work, there are models for handling all types of material efficiently . . . earth, coal, ore, rock, and other heavy excavation.

Rear-Dump Euclids range in capacity from 10 to 34 tons and are available with standard or quarry bodies . . . semi-rigid or spring mounted drive axles . . . diesel engines from 125 to 300 h.p. Bottom-Dump models have capacities of 13 to 50 cu. yds., 20 to 40 tons, with diesel engines to 275 h.p.

The parts and service facilities of Euclid's world-wide distributor organization assure prompt, efficient service to all Euclid owners. Write today for complete information on the Euclid line or call your distributor for an estimate on your present or future jobs.

THE EUCLID ROAD MACHINERY CO., CLEVELAND 17, OHIO

EUCLIDS

George R. Dempster, A Versatile Fellow

(*Continued from preceding page*)

Gatlinburg, Tenn., in the Great Smoky Mountain region. One of them, Mrs. Blanche D. Moffett, a 78-year-old widow, runs a successful tearoom and is well known to tourists as "The Lady of the Wishing Well". Into this wishing well, outside the tearoom entrance, people toss money as contributions for the Crippled Children's Hospital in Knoxville. A little verse on the back of the restaurant menu reminds visitors of the purpose of the well:

"Upon the well she placed a bell
To toll a prayer as each coin fell
That another child in cruelest pain
Might be restored to health again."

Not many know it, but that stanza was written by a man who might well be called Mr. Construction—George R. Dempster of Knoxville, Tennessee.

Cutting Electrode For Difficult Metals

A new all-purpose electrode that cuts, pierces, gouges, chamfers, or removes welds without the use of oxygen or special equipment has been developed by All-State Welding Alloys Co., Inc., 273 Ferris Ave., White Plains, N. Y. Its performance, without oxygen, on difficult metals such as cast iron, nickel, and stainless steel is said to be better than that of arc cutting with oxygen. It may also be used for cutting iron, steel, aluminum, copper, copper alloys, and nickel alloys, according to All-State. Grease-impregnated cast iron can be prepared for welding with this electrode.

What gives the electrode its fast cutting and easy control, according to the company, is a highly heat-resistant coating that concentrates the arc at the tip and burns off at an even rate with the metallic core. Sizes for all thicknesses of metals are available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 118.

Industrial-Hose Catalogs

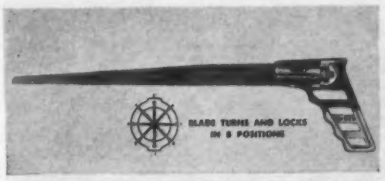
A three-pocket portfolio containing the latest catalogs on Weatherhead industrial hose, hose ends, and tube fittings is offered by The Weatherhead Co., 300 E. 131st St., Cleveland 8, Ohio.

Catalog H-1451 describes the company's latest development of reusable steel hose ends, as well as industrial hose for all hydraulic purposes, and for fuel and oil lines for diesel engines or other flexible-hose requirements. These hose offer a range of working pressures up to 5,000 psi. The all-steel hose ends can be assembled with ordinary bench hand tools, the folder points out.

Catalog No. E-1457 covers Ermeto steel and stainless-steel fittings. The Weatherhead Ermeto fitting requires no flaring, no threading, no welding, and no soldering, the bulletin states. It consists of only three parts and is easily assembled. It has been used for special instrument work at pressures up to 40,000 psi, and in the smaller sizes has been tested at hydrostatic pressure of 65,000 psi without failure.

Catalog No. F-1456 shows a complete line of brass inverted, S.A.E., compression, threaded-sleeve type, and pipe fittings. The fittings are made from extruded brass rod permitting large flat wrench surfaces on all elbows and tees. The use of extruded rod eliminates all danger of porosity, gives greater strength to fittings than castings, and makes them lighter in weight than forgings, but with equal strength, according to the literature.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 138.



The new Millers Falls No. 525 keyhole saw has a rotatable blade that turns and locks in eight positions.

A New Keyhole Saw With Rotatable Blade

A new rotatable-blade keyhole saw is announced by Millers Falls Co., Greenfield, Mass. It cuts steel, iron, wood, plaster, plastics, asbestos, nonferrous metals, fiber board, hard rubber, plywood, and many other materials, the company states.

The tapered 11¼-inch blade is designed to reach tight places, curves, and corners where hacksaw frames and standard wood saws can't be used. And because the blade turns and locks in any one of 8 positions, the handle is always in the clear.

Standard equipment includes a Tuf-Flex blade with 10 teeth to the inch. Interchangeable special-purpose blades are also available. These include a 24-tooth Tuf-Flex and a 7-tooth spring-tempered wood-cutting blade. The former is adapted for cutting thin sheet metal and tubing. The No. 525 keyhole saw can be supplied complete with any of the three types of blades installed, or individual blades may be purchased separately to make up a 3-in-1 kit.

The handle is a casting with enough weight to facilitate metal cutting. It has a pleasing, sure, and comfortable grip, the manufacturer says. The finish is glossy gray and red enamel. The blade holder and thumb-screw nut are nickel-plated. Overall length is 15½ inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 126.

Euclid Ups Brown, McClimon

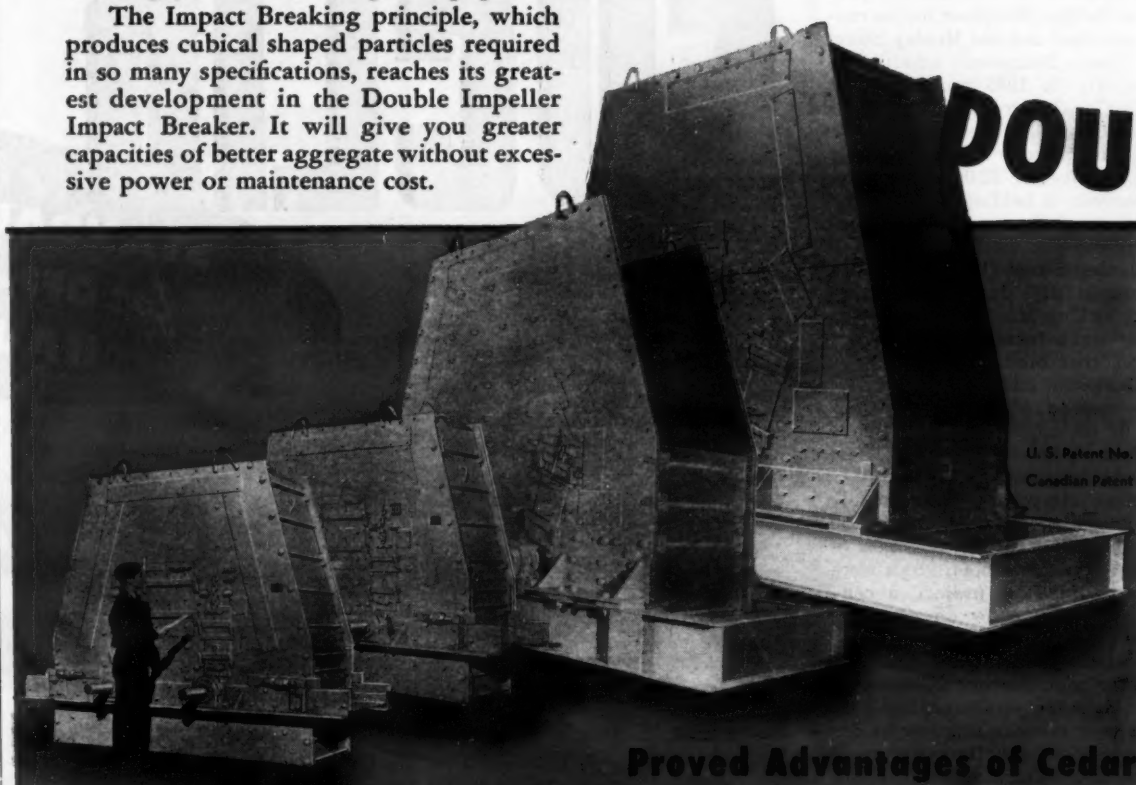
R. M. Brown has been named District Manager for The Euclid Road Machinery Co. in Ohio, western Pennsylvania, Indiana, Michigan, and Kentucky. Alan S. McClimon succeeds him as Manager of the Sales Development Dept.

HERE'S the latest addition to the already broad line of Cedarapids crushers! The Double Impeller Impact Breaker, formerly made by New Holland, makes it possible to handle almost *any* primary or secondary crushing job with Cedarapids equipment.

The Impact Breaking principle, which produces cubical shaped particles required in so many specifications, reaches its greatest development in the Double Impeller Impact Breaker. It will give you greater capacities of better aggregate without excessive power or maintenance cost.

NOW A

DOUBLE



Proved Advantages of Cedarapids Double Impeller Impact Breaker

- EXTREMELY high ratio of reduction means less accessory equipment such as conveyors, hoppers, screens, elevators and secondary crushers.
- PRODUCES ideal cubical product even in slabby material. In eastern quarries where conventional types of crushers broke the stone up into high percentages of flats and elongated particles the Impact Breaker reduced the percentage from 24% to 6%.
- ELIMINATES most soft stone from the finished product.
- Can be operated in contaminated material where most other types of equipment would clog, because a greater number of large pieces of stone or gravel bombarding the cage bars help to keep the breaker clean.
- LESS horsepower required per ton of material in most all cases because the massive impellers statically balanced, have a flywheel effect and a great percentage of stone is broken in mid-air by stone hitting stone resulting in a greater reduction in milling and crushing action.
- BIG volume production. In a dolomite installation in Ohio the operator claimed 720 tons per hour using two 150 h. p. motors.
- APPROXIMATELY 50% less contact of stone on metal because a high percentage of the material is broken by impact against other material rather than against the breaker bars. Also attrition minimized as entire discharge opening is free of grates, etc.
- BIG production and high reduction ratio mean lower plant investment.
- CHOICE of four sizes from Model 5050, which will take 50" rock up to 400 tons per hour and reduce it to 4" minus in one operation, down to the Model 2020 with its 20" square feed opening.

Cedarapids Built by IOWA

THE IOWA LINE *of Material Handling Equipment Includes:*
ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • BUCKET ELEVATORS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDER TRAPS • PORTABLE POWER CONVEYORS • PORTABLE STONE AND GRAVEL PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • HAMMERMILLS • DRAG SCRAPER TANKS • WASHING PLANTS • SOIL COMPACTION UNITS • STEEL TRUCKS AND TRAILERS • KUBIT IMPACT BREAKERS

Hand Level Features Outside Adjustment

The new hand level developed by Stratex Instrument Co., 1861 Hillhurst Ave., Los Angeles 27, Calif., features quick outside adjustment designed to eliminate "halving" of errors and peg adjustments. It can be quickly adjusted with a penknife, the company says, by rotating the index prism.

The level also features a "lazy" gliding bubble and a nonmetallic drawtube bearing for easy sliding action. The U-shaped one-piece optical chassis is suspended independently of the optical tube. The new hand level has a corundum finish and is supplied with a saddle-leather belt loop case. It measures 5¾ inches closed and 7 inches when extended. These new levels may be easily dismounted and reassembled for repair. Models include the Silver City Locke type and the Franciscan adjustable hand level.

Quick outside adjustment by rotating the index prism is the feature of the new Stratex hand level.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 154.

Engine-Generator Catalog

An 8-page catalog describing self-contained generators designed for gasoline, gas, or diesel power source is available from The Ready-Power Co., 11231 Freud, Detroit 14, Mich. Bulletin 263-2 illustrates a variety of generators in capacities up to 25 kw in the mobile units and 100 kw in the stationary units. The mobile units are mounted on two-wheeled chassis equipped with springs, pneumatic tires, towbar, coupling eye, fuel tank, and battery. Both direct and alternating-current models are available.

All mechanical, electrical, and construction features are fully explained in the bulletin. Many applications are illustrated. The bulletin also highlights generators especially designed and built for magnet operations for use on locomotive and crawler cranes.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 64.

A Cedarapids PRODUCT!

Built by IOWA

MPELLER IMPACT BREAKER

(formerly New Holland)

DOUBLE IMPACT ACTION GIVES YOU ALL THESE ADVANTAGES

MATERIAL entering the breaking chamber falls directly onto the rotating impellers. Rotating upward and outward at speeds up to 1000 rpm., these Double Impellers smash the material in mid-air. Up to 6000 smashing blows a minute crash against the material in the breaking chamber.

High percentage of fines can be obtained by operating the impellers up to 1000 rpm. with close bar settings, thereby eliminating need for secondary reduction equipment in many instances.

These breakers can be used for primary and secondary reduction depending upon the application and the model used.

Only two moving parts—the impellers—both easily accessible. Minimum down time for repairs or replacements because of simplicity of design.

Sectional view of Cedarapids Double Impeller Impact Breaker showing simplicity of construction and operation. Material falls directly onto impellers and is hurled against the breaker bars and other material in the breaking chamber.

The product size is controlled by the speed of the impellers and the adjustment of the breaker bars. No mechanical change is necessary to change the size of product but simply increase or decrease the rpm.

Only Cedarapids Double Impeller Impact Breakers give you all these features. No imitation can equal their performance. Protected fully by patents. Beware of imitations.

To Present Owners of New Holland Double Impeller Impact Breakers

When you need new equipment or replacement parts on your present machine address your inquiries to Cedar Rapids or call your nearest Cedarapids distributor.

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HAMMER MILLS in three sizes from 4033 to 2033

ROLL CRUSHERS in six sizes from 6024 to 1616

KUBIT IMPACT BREAKERS in four sizes Nos. 0, 1, 2, 4

OWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

A New Portable Unit For FM Communication

A new, completely portable FM communication unit for the 30 to 50-megacycle band has been announced by Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Oreg. Total weight of the new unit, including self-contained batteries, is less than 25 pounds, and it can be carried on the back like the usual pack board.

With these batteries, it has a power output of 1 to 1½ watts, the company says. However, heavy-duty battery packs, or vibrator power supply operating from a car battery, can be plugged into the FM unit to boost the power output as high as 7½ watts for more permanent or longer communicating distances.

Controls on top of the unit provide easy access if the radio is used on the floor of a truck, auto, or aircraft. According to the manufacturer, this new Type 1144 FM unit meets specifications of the Federal Communications Commission Forestry Department and various government agencies.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 40.

New Excavator Light

A new light for heavy-duty floodlighting on shovels, draglines, trench machines, etc. has been developed by the Contractor's Floodlight Mfg. Co., 30425 Ford Road, Garden City, Detroit, Mich. Designed to withstand shock and vibration, the new floodlight features heavy-duty construction. The bulb base is fully cushioned against shock by a rubber diaphragm. The base and universal mounting bracket are of steel construction. Universal mounting permits traversing, elevating, and depressing through 360 degrees. An easy-opening floodlight back facilitates bulb changes without danger of breaking the lens. The light also features an aluminum cast body, a chrome-plated 16-gage copper reflector which adjusts to any focus from spot to full flood, and a waterproof air vent for cooling.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 144.

Composite Patch Material

An iron-asphalt patching material designed for long-life repairs of worn concrete floors is described in a new 8-page illustrated bulletin issued by The Master Builders Co., 7016 Euclid Ave., Cleveland, Ohio. According to the manufacturer, this material overcomes the problem of early breakdown under impact. The use of scientifically graded, ductile, metallic aggregate makes feather-edging easy and provides long-life repairs when the material is properly bonded to the old concrete surface, the folder points out.

This literature may be secured from the company, or by using the Request Card at page 16. Circle No. 137.

Tubular Steel Scaffolds

The full line of Advance tubular steel scaffolding is illustrated and described in Folder A6 prepared by Beaver Art Metal Corp., Advance Scaffold Division, 1200 Factory Ave., Ellwood City, Pa. Included in the folder are descriptions of the patented self-contained cam locks for instantly attaching cross braces to panels, and the Stack lock for locking panels together vertically.

Various pieces of equipment for standard panels are illustrated. These include 5-foot end sections in heights ranging from 3 to 6½ feet; straddle braces; brackets; foot plates, putlogs; ladders; casters; etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 139.

County Builds Highways In Spite of Old Lake Bed

Maintenance of Oiled Mats Is a Constant Fight With Subsoil Drainage and Lack Of Materials

✦ TAKE the bottom of a lake bed as large as a county. Mix in plenty of silty soil and alkali. Remove mountains, rock, gravel, and other such material. Multiply the population. Raise the water table. Build 1,065 miles of county highways to serve the people.

Then try to maintain these highways which run through the bottom of a lake, and at the same time keep the people happy.

That, briefly, is the problem which confronts the Road Department of Kings County, headquartered in Hanford, Calif. As California counties go, Kings is one of the smaller counties, but its problem of lack of road-building materials added to that of natural ground moisture is unique.

Both problems are being worked out at this time, in spite of some of the most adverse natural conditions known to road builders. The lack of granular materials is being solved by a method of asphalt road-mix construction which makes use of native soils. Drainage is being worked out under close liaison with the farmers, for Kings County is primarily an agricultural area.

Asphalt Mats Built

The growth of the Kings County highway system from a pioneer network near the turn of the century has now resulted in a well located grid of roads throughout the entire county. The stages of dirt roads and other low-type construction are now over, and today the 1,065-mile system is about 99 per cent asphalt-surfaced. The only unsurfaced roads in the county are some on forest lands owned by the U. S. Government, and these roads are bladed only twice or three times a year as a fire-control measure.

The recurring of periodic flood conditions, caused by heavy rains and snowfall in the Sierra Nevada Mountains to the east, sometimes results in refilling the old basin of Tulare Lake and overflowing lands adjacent to the rivers, creeks, and sloughs which enter the county. The fact that some 350 to 400 square miles of the county's 1,390-square-mile area may then be under water for varying lengths of time causes great damage to the roads in those sections.

Under even the best conditions, road engineers have to figure on ripping up the oil mats every 5 years. And it is often necessary every year, for weakened subgrade lowers the effective life of an asphalt mat.

The problem has led Kings County to develop a type of bituminous mat which combines strength with ductility. The mats are now generally constructed to a finished thickness of 3 inches.

The mat is made by windrowing the sandy, silty native soil, and adding from 1.5 to 3.5 gallons of SC-3 and SC-4 asphalt per square yard of finished mat, depending on the type of soil. Mats made with SC asphalts have as much strength as can be developed readily from the soils, and they have the added advantage of being comparatively easy to break down when reconstruction by maintenance forces is required.

Road surfaces which require reworking fall generally into two main classifications. The first and principal type of failure is caused by soggy subgrade, and is characterized by a washboard surface and other typical signs of shoving. The second type is often characterized by checking, cracking, or disintegration of the mat. It is caused by a chemical reaction between the asphalt and alkali in the soil. To all outward appearances, the alkali virtually eats up the asphalt filler.

Where a high water table is the principal problem, Kings County road builders are solving it by borrowing good earth from near-by farms, and raising the roadbeds several feet above the surrounding country. Farmers are usually willing and anxious to give the dirt, because if it is removed from high spots on the farm it helps to level the land. Land leveling, in fact, is one of the causes of present-day headaches of highway flooding. The leveling of land has often blocked natural waterways, and the only place the water can go is to a county road, usually lower in elevation than some of the leveled land.

After the subgrades are raised, the usual methods of construction, or maintenance, by blade-mixing, are followed. The county maintains a rather extensive fleet of equipment for this work. It includes about 50 dump trucks of various makes for hauling material, 22 tractors with two front-end loaders, 12 power motor graders, 4 rollers, 3 small draglines, two earth-moving scrapers, and miscellaneous items of equipment for distributing asphalt and so on.

Many methods have been used to pulverize the old asphalt mats, in order that they may be reworked and salvaged. Sheepsfoot rollers, disks, motor-grader scarifiers and blades have been used, all with a great deal of success, but slow and costly. The need for equipment that will reduce the oil cake (sometimes veritably oil-sand rock) to the original ground texture, in a few operations and a short time, is most apparent. County Surveyor Hayes hopes that some good Samaritan in the equipment manufacturing field will develop something along this line. Maybe a mobile rock crusher, a series of roller crushers—who knows?

Rippers have to be used to break up the cake, however, for the asphalt mats are tough. Once broken up, they are worked until the bituminous material is reduced in size to very fine material. Then the hot asphalt is brought in, applied in about four or five shots, and the windrow is again blade-mixed prior to laying the material down again.

Maintenance of highways is not budgeted according to a per-mile figure. The annual budget is spent to improve the highway system each year, and the money is stretched as far as it will go. Each year the Road Maintenance and Construction Department, under County Surveyor J. R. "Cap" Hayes, goes over about 20 per cent of the system.

Regular maintenance which practically duplicates construction may be a hard way to keep the highways in operating shape, but it is the best and only system Kings County has found which will whip the lake-bed problems of moisture, alkali, and generally unsatisfactory mineral filler.

Mobile Field Office

Self-powered mobile field offices for use in the construction industry are available from the Frazier-Fencil Corp., 1323 Macklind Ave., St. Louis 10, Mo. They are converted from recent-model GMC Yellow Coaches and have 240 square feet of floor area. All seats have been removed except the rear and rear-side seats. The offices are equipped with an oil-burning stove and two wooden hinged doors with lock installed; they are wired with standard 110-ac electric wiring. Filing cabinets, desks, tables, chairs, etc., are available.

Mobile field offices are converted from GMC Yellow Coaches by Frazier-Fencil Corp. They have 240 square feet of floor area.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 45.

Pipe-Bending Machines

A 60-page catalog dealing with pipe-bending and cutting machines, and the fabrication of pipe and tubing, has been prepared to mark its 50th anniversary by Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Ill. The booklet discusses the problem of bending and emphasizes the features of Wallace benders. It gives a complete description of each bender, along with specifications and illustrations. All models are covered in the catalog.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 150.

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Moisture Seepage
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MM Industrial *Wheelers* are fast, easy to steer, and simple to operate. Perform complete trenching operations when equipped with rear-mounted hydraulic back-hoe and front-end loader! 5,000—10,000 pound front-end capacity. Amazingly economical to own and operate! 27 hp or 49 hp. Available with combination of attachments for construction or maintenance jobs.

Send complete facts on MM Industrial Wheelers.

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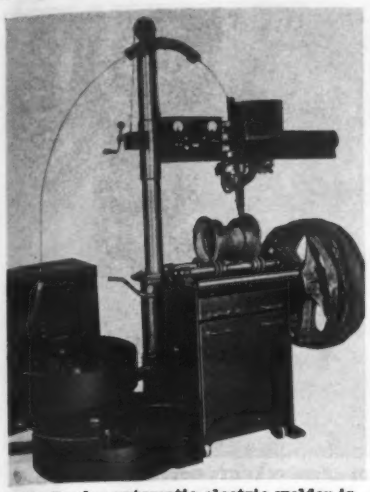

The Leader automatic electric welder is a one-package unit for production welding and for hard-facing.

Automatic Welding

A new unitized automatic welding machine, designed for production welding and hard-facing, is made by Leader Welding & Mfg. Co., 2418 Sixth St., Berkeley, Calif. It incorporates a 500-amp ac welder, an automatic welding head, and a positioner with accommodations for both horizontal and angular mounting of the work. The unit connects to 220 or 440-volt ac power lines.

The ac power supply contains two windings. The heavy-duty side supplies the automatic head with variable heats of from 100 to 500 amperes. A separate stinger winding of 120-amp capacity is always ready for tack-welding operations, aiding set-ups. The automatic head handles all sizes and types of automatic wires and has provisions for manual step-over control for spacing weld beads, as well as horizontal travel along its supporting arm. If submerged arc operation is required, flux is supplied from an attached hopper. All machine controls are set up for dual operation at the machine or the welder. Control circuits are 110-volt ac.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 141.

Portable Electric Tools

A new 16-page pocket-sized catalog, No. 50A, illustrates and describes the complete line of Hi-Power and Zephyr portable electric drills, hand saws, paint sprayers, paint-brush cleaners, and drill kits. Prepared by Portable Electric Tools, Inc., 320 W. 83rd St., Chicago 20, Ill., the catalog gives complete specifications on all portable electric tools made by the company, and information on the attachments and accessories that can be used with ¼-inch electric drills for sanding, grinding, polishing, buffing, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 48.

Wellman Export Office

A new export office has been opened up at 8 S. Michigan Ave., Chicago, by The S. K. Wellman Co., Cleveland, Ohio, manufacturer of Velvetouch all-metal clutch plates, clutch facings, and brake linings for trucks and earth-moving equipment. John H. Crosby and J. Albert Roesch are directing the office.

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"Invisible" Lines Simplify Tracing

Tracing paper with cross-section ruling that will not reproduce under a blueprint, black and white, or Ozalid process has been developed by the Ogilvie Press, 691 Fulton St., Brooklyn 17, N. Y. The paper is available in two qualities: Veltex No. 450, a 100 per cent rag resin-treated vellum; and Bondtex No. 150, a 100 per cent rag natural tracing bond. It comes in 8½ x 11, 11 x 17, and 12 x 18-inch sizes, with 4 x 4, 5 x 5, 6 x 6, 8 x 8, 10 x 10, 12 x 12, 16 x 16, and 20 x 20 rulings to the inch. Millimeter and isometric rulings are also available. This paper with the "invisible" cross-section rulings is said to be particularly valuable for sketch work. Standard or specified headings can be printed on each of the papers.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 11.

New Heating Torch

Word has come in that Air Reduction Sales Co., a division of Air Reduction, Inc., 60 E. 42nd St., New York 17, N. Y., is now national distributor for the Prepo Torch, a unit designed to give an instant heat of 2,200 degrees F for soldering joints, loosening nuts, sweating cable, and many other operations. No preheating, pumping, or priming are required, according to Airco.

The torch weighs 1½ pounds and can be used in any position. It features a throwaway fuel container which carries enough fuel for 4 hours of work, a flame that remains constant until fuel is exhausted, odorless heat, and the use of a nonpoisonous nontoxic fuel. The Prepo Torch comes complete with two burners, one can of fuel, and operating instructions.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 107.

Detachable Rock Bits

An 8-page bulletin which discusses the properties, characteristics, and economies of detachable rock bits that can be thrown away has been prepared by the Throwaway Bit Corp., 4200 N. W. Yeon Ave., Portland 10, Oreg. It points out the features of Throwaway bits and the saving in costly equipment otherwise used for reconditioning drill steel or used bits. It illustrates the bits and points out that they are suitable for drilling with all types of machines—from the lightest 2½-inch jackhammer to the heaviest 4-inch drill—with any size or type of steel. The literature also offers general instructions, indicating how the bits may be attached and detached and applied for use in quarrying, mining, tunneling or dam construction.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 149.

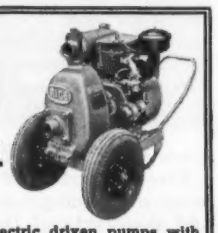
Starts 2nd Century by Moving

Richard Dudgeon, Inc., 100-year-old manufacturer of hydraulic machinery, has moved from its present plant at 24-26 Columbia St., New York City, to new quarters at 789 Bergen St., Brooklyn, N. Y. It gave up the plant it had occupied for 90 years to make room for completion of the Hillman Housing Development of East River Apartments.

Wilkie on Sika Staff

Charles Wilkie has joined the sales engineering staff of Sika Chemical Corp., manufacturer of Plastiment and Sika compounds for concrete and masonry. His headquarters are in Passaic, N. J. For the past several years he has been associated with H. K. Ferguson Co., Inc.

Self-Priming
RICE
CENTRIFUGAL PUMPS



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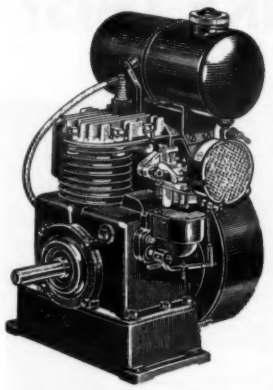

Model K7-1, 1½ H.P. 4-cycle, single cylinder, air-cooled. Length 13", width 14", height 17", Weight 38 lbs.

POWER FOR:
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Road Oilers
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Chain Saws
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And other uses.

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Kohler Engines are designed, engineered and built to give the same dependable, economical service that has won world-wide acceptance for Kohler Electric Plants in construction and other industries. Made in several sizes, they are suited to a wide range of uses. Kohler engineers will gladly assist in working out applications for your particular requirements. Write for information. Dept. 22-W, Kohler Co., Kohler, Wisconsin. Established 1873.

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Unity Plea Is Made At WASHO Parley

(*Continued from page 1*)

the Interstate System if the states moved too slowly with construction. Hale said the prediction was hypothetical, but that if it were true, "maybe there won't be a 40th WASHO meeting".

W. T. Holcomb, WASHO President, called for cooperation also, and compromises where necessary. Holcomb in his annual message took notice of the difference in feeling about Federal Aid in the ranks of highway officialdom.

User Groups Speak

For the first time on the WASHO program, user-group representatives told their side of the highway story. E. S. Moore, Manager, Public Relations Department, California State Automobile Association, deplored the overloading of trucks, saying that the damage caused by such practices was "evident and conclusive". Moore said his organization is studying the relationship between traffic flow and power, and that the underpowered engines in some trucks were particularly serious.

The opening general session of the WASHO in Reno, Nev. Up front are (left to right) Hal Hale of the WASHO, Governor Vail Pittman of Nevada, W. T. Holcomb of Nevada, Mayor F. E. Smith of Reno, and A. M. Nash of California.

Regarding highway safety, Moore agreed with delegates that excessive speed by automobiles would have to be curbed by strict enforcement.

A lively presentation of all sides of the trucking situation was touched off by John L. Springer, President of the Western Highway Institute, as he explored fully all the areas of agreement and disagreement between highway engineers and truck operators.

Springer listed among the areas of disagreement the lack of stable trucking organizations in the past, taxation, weighing and overloading, sizes, and weights. As engineers and truckers get together over the conference table more and more, Springer said, the areas of disagreement should disappear. He said that all of the key officials of western trucking lines were in the west where they could be reached easily, "and you won't have to go to Chicago or New York to find an official with authority to speak".

Truck organizations are in complete agreement with highway officials in their opposition to toll roads and diversion of funds, Springer explained. He said that the trucking industry applauds the efforts engineers are making to build safety into the highways, and that they were all for more limited-access legislation.

Western railroads are among the large operators of motor transport fleets, Springer said. He named the Southern Pacific, Northern Pacific, Union Pacific, Santa Fe, and the Denver & Rio Grande Western among those who are now operating large fleets of commercial motor carriers, and said that efforts are

(*Continued on next page*)

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WHEN YOU'RE DAYDREAMING perhaps you, like most people, find yourself doodling pictures of the things you want most.

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Or you're wondering which college you'd like your child to attend a few years from now. Or maybe you'd like to own a brand-new automobile someday.

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Malleable Iron and Promal Elevator Buckets—
Built for Rugged, Heavy-Duty Service

Link-Belt elevator buckets are long-lasting, accurate in shape and dimensions and their strong, smooth, seamless, uniform construction, assures proper filling and clean discharge. They have reinforced corners and are resistant to rust and corrosion. Available in various sizes, capacities and styles. Contact your nearest Link-Belt Office.

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APPLICATOR BARS & WELDING ELECTRODES
● MANGANAL APPLICATOR BARS practically eliminate build-up time.
● HAMMERS repaired with MANGANAL usually outlast new ones.
● MANGANAL workhardens under impact and abrasion up to 550 Brinell. Its extreme toughness resists breakage.
● APPLICATOR BARS are best applied with Special Tite-Kote Welding Electrodes.
● FOR still longer life, overlay corners with SEACO Hard-Surfacing Electrodes.
Write TODAY for FREE Informative Literature. Gives Helpful Suggestions for Repair of Quarry, Mining & Contractors' Equipment.
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91 N. J. Railroad Ave., Newark 5, N. J.

under way to extend their scope of permits in that regard.

The other side of trucking was presented in the form of a visual demonstration of highway strains and stresses. George M. Williams, Construction and Maintenance Engineer, Western Headquarters, Bureau of Public Roads, used machines built recently by the BPR to make his demonstration.

Williams showed how a road is broken up by repeated flexing beyond the design strength. He showed the effect of various axle loads and spacings on highways. Of particular interest was his demonstration that tire bearing area would have to be increased 64 times to show any significant drop in highway damage. A scale model of a 75-foot pony-truss bridge was used to show stresses in the members as loads of various kinds passed over the structure.

Glenn S. Paxson, Bridge Engineer of the Oregon State Highway Commission, told how a recent WASHO study of truck sizes and weights had been made. There is not enough information about the problem, Paxson said. He told how the state of Maryland was now testing two sections of highway to destruction, one with 18,000-pound axle loads, the other with 22,400-pound loads. He forecast the necessity for replacement of many S-15 bridges in the country much earlier than was expected.

Photogrammetric Mapping

Photogrammetric mapping practices and techniques were outlined by Louis A. Woodward, representing Jack Ammann of San Antonio. Color photography is now available for the positive identification of soils, he said, but the cost is still high.

Aerial photography can be used with a great degree of secrecy by highway departments, both for preliminary and final location, Woodward explained. On one recent job there was an initial variation of only 4 per cent in earth yardage computed from aerial photographs and initial field surveys. Final quantities paid to the contractor checked the aerial computations almost exactly.

Woodward urged that up-to-date maps be used, however, particularly in areas where populations are on the increase. He told how a pipe-line company saved about $500 by using old maps, only to find later on that an army airfield and other installations had been built across the proposed line. The company spent thousands of dollars to change the location and shift machinery and materials which had already been unloaded.

A second new aspect of highway engineering was outlined by Robert W. Bruce of the Bell Telephone Co. of Nevada, as he discussed employee and public relations. Good employee relations, he said, are the cornerstone of good public relations. Employees have a right to know the reasons behind the rules. They not only should be informed, he said, but at least once a year each employee's performance should be analyzed in the light of what goal the company is aiming for.

The worst kind of supervisor a company can have, Bruce said, is the cold, unresponsive type who instills fear in employees by giving orders but not explanations; who emphasizes secrecy and prestige. Such a person can ruin the morale of countless employees, he said, adding that "one of the tests you have never yet devised is a measure of employee morale and loyalty".

Training of employees should be a must, Bruce said, if a company is to improve.

AGC Takes Part

Coincidentally with the WASHO meeting, the Western Chapter of the Associated General Contractors of America held a meeting in Reno to discuss current problems, largely in the field of labor relations. Many of the contractors attended the WASHO sessions, especially a series of panel discussions on construction, maintenance, and other phases of highway engineering. A joint AGC-WASHO meeting was also held.

A. N. Carter, Highway Division Manager of AGC, described for the WASHO delegates the responsibilities of the general contractor on highway construction. More and more the contractor is a full-fledged partner in the road-building business, Carter explained, and as such his field of responsibility is constantly broadening.

For example, contractors can help highway departments get qualified, well paid engineers, he said. In the state of Wyoming recently, AGC helped to get a Highway Department pension plan through. In Missouri the AGC is backing the Highway Department to the limit, through press stories and advertising.

C. & E. M. Photo

From left to right, W. T. Holcomb of Nevada, outgoing WASHO President; Hal Hale, Executive Secretary of the WASHO; and Mayor Francis R. Smith of Reno.

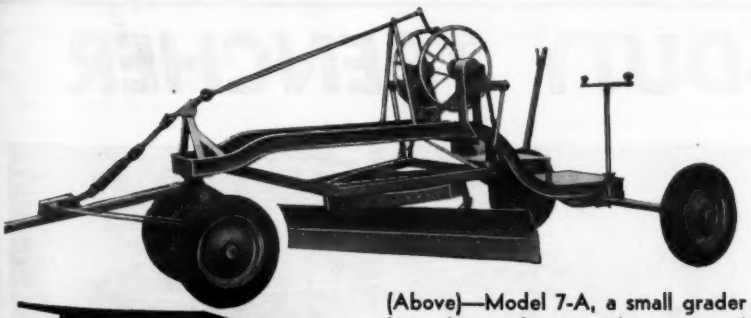
Carter said it was as important for the contractor as for the highway department to deliver the most value for the highway dollar. Contractors can help highway departments prepare long-range plans, they can help protect the roads they build, they can do much to oppose tax diversion and overloading practices, and they can help to revise specifications.

Since cooperation is a two-way street, Carter told the WASHO delegates what they could do to make the contractor's lot easier. Engineers should permit to the fullest the use of new equipment and construction materials, as they are introduced. Delays to the contractor must be reduced. Hand labor should be cut to a minimum.

Contracts should be awarded in various sizes, so the small, new contractor can have a chance to offer competition to established firms. A longer construction season might be gained if some awards were made early in the year, some later on. A balanced construction program would insure that work of all general types would be spread out more uniformly. Carter also asked for prompt payment of estimates, and said that many contractors still felt that payment was too slow.

Since 1948, construction costs have dropped 14.9 per cent on highway work, Carter concluded, saying "The contract method is something the contractors and engineers alike can be proud of".

(Concluded on next page)



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Indianola, Iowa

Unity Plea Is Made At WASHO Parley

(*Continued from preceding page*)

Resolutions Adopted

In an effort to get more facts regarding sizes and weights of motor vehicles, a resolution was adopted which called for further study of this subject with representatives of the trucking industry, and stipulated that the AASHO standards continue as a guide in the interim.

Other resolutions included the approval of a current Highway Research Board project studying the effect of various loads on pavement and subbases, with the recommendation that financing be done on a pro-rata basis of Federal Aid furnished to the several states. The organization went on record favoring a comprehensive western-state study of loads and taxation. It called for the immediate appropriation of $35,000,000 for forest highway construction to relieve bottlenecks.

Vigorous, fearless enforcement of weight limits was urged, with particular reference to overloading by some of today's heavy construction equipment. There was a resolution to speed HR-7941 through the U. S. Senate, and a move to enlarge the Committee on Standards. A request for admission to WASHO by Alaska was taken under consideration.

Anderson Heads New Officers

W. L. Anderson, Chief Engineer of the Utah State Road Commission, was elected the WASHO's new President, with A. M. Nash of California as Vice President and J. A. Elliott of Texas as Secretary-Treasurer. On the Executive Committee, delegates placed W. A. Bugge, Director of Highways of Washington, P. G. Poore of Montana, and Mark U. Watrous of Colorado.

Builder Job-Tests Drill-and-Tap Tool

The $2,000,000 New Lincoln High School in East St. Louis, Ill., is a functional brick and steel structure which has window sections running almost its entire length with only the structural-steel I-beams as mullions. Aluminum mullion covers are screwed to both the inside and the outside of each beam. The covers came with six holes drilled. In order to install them it was necessary to drill and tap an equal number of matching holes on each side of the I-beams. There were 208 mullion covers to be installed and a total of 1,254 holes to be drilled and tapped.

Ferd Ganschinietz, general contractor, had his men use an Ingersoll-Rand Impactool for this operation. With the mullion cover serving as a template, the Impactool, fitted with a standard drill, drilled holes ⅝ inch into the steel I-beam to accommodate ½-inch 10-24 aluminum machine screws. The tool was then fitted with a 10-24 tap and the holes were tapped. The tool weighs 6 pounds 8 ounces, and in operation there is no twist or kick to fight at the handle, since power is transmitted from the motor to the work by a multitude of swift, light, rotary blows.

In order to compare old working methods with this new one, Mr. Ganschinietz ran a time test on the drilling and tapping operation. Two men and a helper, using a hand drill and a hand-turned tap, drilled and tapped six holes in an average of 60 minutes. Using the Impactool—fitted alternately with drill and tap—they averaged 20 minutes.

At the New Lincoln High School in East St. Louis, Ill., carpenter Charles Herbert holds a factory-drilled window mullion cover in place as a template, while Eugene Ganschinietz uses an Ingersoll-Rand electric Impactool to drill a ⅝-inch hole into the steel I-beam. An appreciable saving in time over hand drilling was reported.

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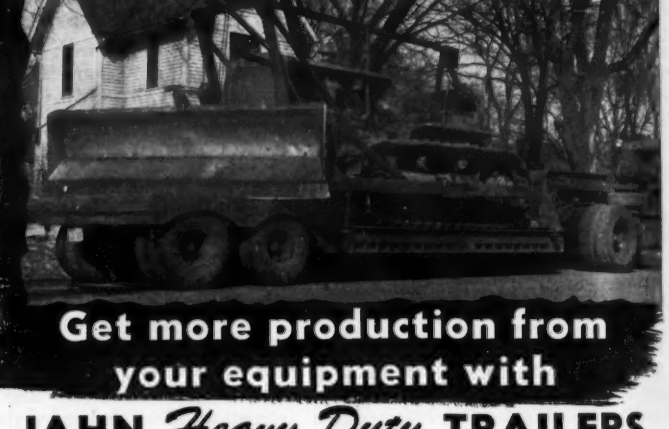

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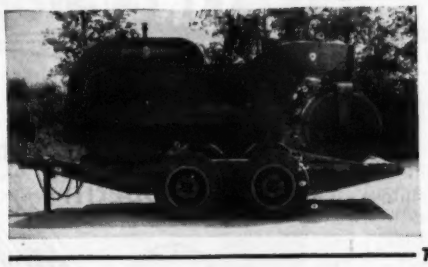

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"Murder Hollow" Goes With Road Relocation

Deep Fill Wipes Out Low Point Over Creek, and Two Lines of 15-Foot-Diameter Pipe Replace Arch Bridge

✦ LAST year the Vermont Department of Highways wiped out Murder Hollow, a low point on U. S. 5 in Dummerston, 7 miles north of Brattleboro. By relocating 1⅓ miles of the Calvin Coolidge Memorial Highway, the nine curves in the original section were reduced to two of only 1 and 4 degrees. Steep 10 and 12 per cent grades entering and leaving the hollow were also modified in the new alignment to 3½ and 5 per cent grades. At the low point in the profile, the stone arch bridge over Canoe Creek was eliminated in favor of twin lines of 15-foot-diameter metal pipe topped by a 50-foot fill.

The concentrated heavy grading project got under way in April, 1949, after the Vermont Department of Highways awarded a contract for the work to the S. V. Rossi Construction Co. of Torrington, Conn., on its low bid of $229,155. A mixed-in-place bituminous pavement was included in the job items. The road relocation was completed before November 15, the expiration date of the contract.

Murder Hollow, about midway in the section picked out for improvement, had been so named because of the mysterious slaying many years ago of an itinerant peddler at the place where the road dips down to cross the creek. In later years the name took on double significance as motorists came to grief on the steep grades and sharp reverse curves. This was especially true in winter when ice formed on the pavement.

New Roadbed

On the relocation there is now a tangent 6,000 feet long, with moderate curves only at the ends where the road ties back to the existing highway. The 20-foot pavement of the old road has given way to a 24-foot pavement on the new alignment. The 2½-inch mixed-in-place bituminous mat is crowned 4 inches at the center, and rests on an 18-inch gravel sub-base which extends out through 8-foot shoulders pitching ½ inch to the foot. Cut and fill slopes are 1 to 2; however some of the shallow fill sections have slopes that are flattened out to 1 to 4.

Most of the dirt-moving was concentrated in Murder Hollow for the 50-foot fill over the creek. The total length of this fill was around 900 feet, with the height decreasing toward the ends. At the south end of the fill a bluff was cut down 20 feet, thus flattening the profile and providing needed material for the fill. Altogether about 100,000 cubic yards of dirt were required at this point. What did not come out of the roadway excavation was obtained from a borrow pit near the center of the job and close to the highway.

The roadway cuts were mostly clay, and this material was generally wet. For the heavy going in the water-saturated soil, the contractor used 3 Linn Haftraks, 7-yard capacity, to advantage. For hauling drier material from the cuts or borrow pits he used 5 Sterling and Mack trucks holding either 5 or 6 yards. Excavating equipment included a Thew-Lorain Model 820 2-yard shovel; a Thew-Lorain 41¾-yard shovel; and a Link-Belt Speeder ¾-yard shovel.

Gravel Sub-Base

For fills, the sandy-gravel borrow was mixed in with the clay to provide a better surface for the hauling equipment and to obtain better compaction. As the dirt was dumped, it was spread in from 6 to 12-inch lifts by three tractor-dozers: a Caterpillar D7, an Allis-Chalmers HD-10, and an International TD-40. Along with the heavy equipment, a Bros sheepsfoot roller pulled by an International T-20 tractor helped achieve compaction. Hauls were short, from 500 to 1,000 feet, and about 3,000 yards were placed in a 10-hour day.

C. & E. M. Photo

The old Murder Hollow section of road and its realignment. A 50-foot fill is going in over two lines of pipe to replace the stone arch bridge. A 20-foot cut will be made in the bluff to the rear.

A small amount of rock was encountered, and this was blasted out with Du Pont dynamite. Drill holes were made by a wagon drill and two jackhammers, both Ingersoll-Rands, with air supplied by two I-R compressors—one a 315-cfm and the other a 105-cfm.

Gravel for the 18-inch sub-base was obtained from a pit ½ mile from the south end of the job. It was hauled in the trucks already mentioned and in three 3-yard Internationals. It was placed in three 6-inch lifts by the graders and shaped by a pair of motor graders—a Caterpillar 12 and an Austin-Western 99-A.

Pipe for Bridge

The old arch bridge spanning Canoe Creek carried a 21-foot roadway and was 36 feet 5 inches long. It had a clear vertical height of about 11 feet, with a rise of 6 feet 8 inches. The twin metal pipes carrying the creek under the adjoining fill are 15 feet in diameter with their side walls 15 feet apart. At the invert the pipes are 270 feet long, and at the top they are 212 feet 6 inches, the ends being burned off on a bevel to match the fill slope.

The pipe work was subbed to the

(*Concluded on next page*)

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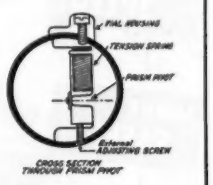

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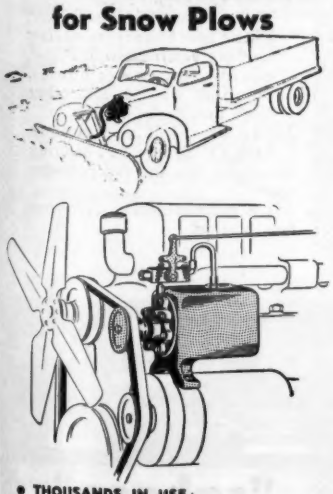

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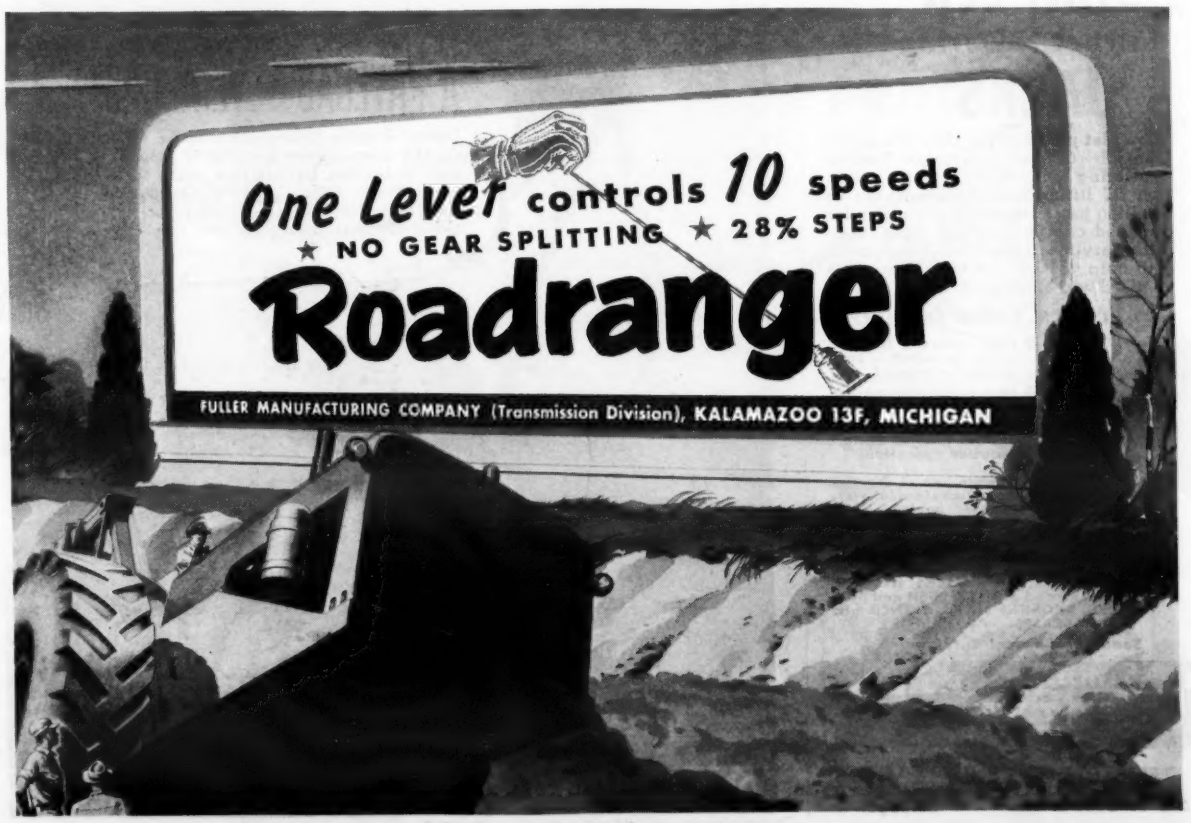
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"Murder Hollow" Goes With Road Relocation

(*Continued from preceding page*)

Berger Metal Co. of Westminster, Vt., which obtained the No. 1 gage material from the Republic Steel Co. of Cleveland, Ohio. The pipe was laid on dry ground, and the creek was later diverted into it. On the clay bottom of the hollow, a 6-inch compacted layer of spruce boughs was spread over the line prepared for the pipe. Over this went an 18-inch mat of gravel on which the pipe was laid on a 25-degree skew.

The pipe came in sections—11 to a ring on one length, and 10 on the other. The pieces were 4 to 5 feet wide, and 6 to 8 feet long. They were bolted together with their joints staggered, a total of 50,000 bolts being required for the two pipe culverts. During the installation a 12-inch camber was put at the center of each line. The pipe was strutted with field jacking, a row of 8 x 8 posts on 4-foot centers which were not removed until a month after all the fill was in place. The jacking was done with three 50-ton jacks.

C. & E. M. Photo
Clay in the Vermont relocation cuts was saturated with water. For heavy going, Rossi Construction Co. used Linn Haftraks—here a Thew-Lorain shovel loads one.

Pipe Paving

To prevent scouring of the metal plates by a stream carrying plenty of gravel, the invert of the pipe was paved with asphaltic concrete. The galvanized-metal bottom was first thoroughly cleaned with a 20 per cent solution of muriatic acid, and after this was wiped off, a prime coat of emulsified asphalt was applied at the rate of 0.1 gallon to the square yard. This was followed by a tack coat of RC-1—0.25 gallon to the square yard. Hot plant-mix was then hauled in from an asphalt plant in Northampton, Mass., for paving the invert.

The mix was put down in three layers, the first lift merely to fill out the corrugations which are 2⅛ inches deep. Intermediate and top layers were added until the mix was 3 inches thick above the crest of the corrugation. This depth was maintained for a 7-foot width across the invert; some tapering at the ends extended the width of paving to 8 feet. While one pipe was being paved, water was diverted through the other. The paving operations were done by hand.

At the upstream or inlet end of the pipes, a trash rack was built to keep the openings clear of debris. The rack consisted of 8-inch WF beams 20 feet long, which were set in the ground 6 feet apart to form a protecting arc. Eighteen of these steel beams were required. To these vertical members, a row of I-beams was bolted in a horizontal line 6 inches from the top, and another row 6 feet below that. The backfill around the pipe and under the sides was hand and pneumatic-tamped, while the layers above it were compacted by a sheepsfoot roller. The face of the slope around the pipe is covered with riprap which extends out to the steel trash rack.

Pavement

After the gravel sub-base had been placed the full roadway width, the center 26 feet was primed with RT-5 tar at the rate of ⅓ gallon to the square yard. Crushed gravel for the 2½-inch mixed-in-place surface course was obtained from the Brattleboro Sand & Gravel Co., and was graded from 1½-inch down to No. 4 screen size. The gravel was windrowed down the road, and mixed with RC-4 asphalt applied from a bituminous distributor. The mixing was done with a Caterpillar retread machine pulled by a Linn Haftrak. The bitumen was put on in two shots of 0.5 and 0.4 gallon to the square yard respectively.

The aggregate and asphalt were mixed with three passes of the retread equipment for each application. The material was then spread across the road by the motor graders and rolled by a Buffalo-Springfield 10-ton 3-wheel roller. After the mat was well set, it was given a double bituminous seal with two applications of RC-4 asphalt—0.2 and 0.15 gallon to the square yard respectively. Each shot was covered with a layer of ⅝-inch gravel.

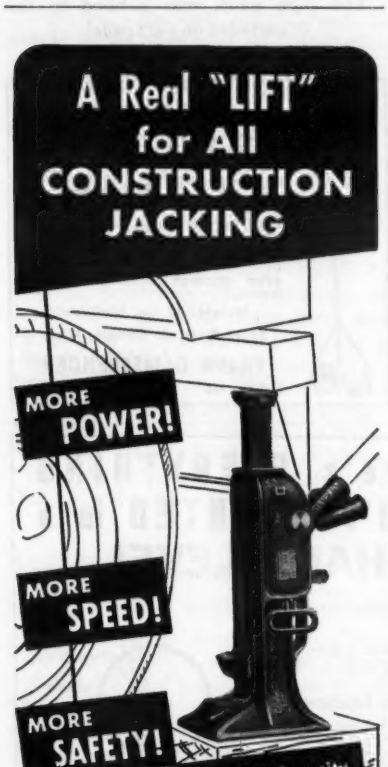
On completion of the new highway, the old road was torn up and turned back into an open field.

Quantities and Personnel

The major items in the 1⅓-mile relocation contract included the following:

Common excavation	123,000 cu. yds.
Rock excavation	3,000 cu. yds.
Borrow	62,000 cu. yds.
Structure excavation	1,560 cu. yds.
Gravel sub-base	26,500 cu. yds.
Refined tar	7,500 gals.
Cut-back asphalt	28,000 gals.
Asphaltic cement (pipe)	360 gals.
Crushed gravel, mixed-in-place surface course	1,500 cu. yds.
Asphaltic concrete (pipe)	90 tons
Metal-plate pipe—twin 180-inch-diameter lines	270 lin. ft.

Charles Rossi was Superintendent for the S. V. Rossi Construction Co., while Alexander Graham was Resident Engineer for the Vermont Department of Highways. The Department is headed by Hubert E. Sargent, Chief Engineer, and F. C. Coates is Construction Engineer.



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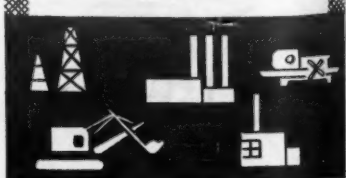

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Explosives Kill Children Ninety Miles From Job Site

THE PROBLEM: *If a contractor negligently leaves unexploded blasting caps on a construction site, and if an adult rightfully on the premises finds the caps and unauthorizedly carries a few of them away, and if later injury results to others through accidental explosion of the caps, would the contractor be liable in damages?*

THE ANSWER: No, according to a decision rendered by the United States Court of Appeals, Tenth Circuit. (Schmidt v. United States, 179 Fed. 2d 724.)

Legal rules applied by the court are of particular interest to contractors using explosives in their operations, although factually the case involved Uncle Sam's liability for death of three children and serious injury of five others in the same family.

Schmidt, the father of the children, was cutting hay on a military reservation for his employer, a Government contractor, when he found some unexploded bazooka shells on land that had been used as a target range. Believing them to be harmless, he took them to his home 90 miles away, without the knowledge or consent of Uncle Sam. The fatal accident occurred while his children were playing with them.

The court decided that the Government might have been negligent in failing to remove the shells, but the case turned upon the general rule of law that negligence does not create liability for ensuing injury, unless the negligence directly causes injury. In this case, the direct cause of the injury was Schmidt's own unauthorized meddling with the shells, according to the majority opinion of the Court of Appeals, one of the three judges dissenting. The judges all agreed that if the Government could have foreseen that such an accident as happened might happen, the Government would have been liable. But the majority said that it could not have been foreseen.

Contractors will be specially interested in the court's survey of judicial decisions thus summarized: Many courts have decided that one who negligently leaves explosives exposed to playing children whose trespass upon premises may be foreseen or expected, may be held liable for resulting injury to them. (The Court of Appeals cites decisions of the appellate courts of Missouri, Oklahoma, Georgia, Washington, Michigan, Minnesota, New Jersey and Nevada to that effect.) On the other hand, it has been decided by appellate courts, including those of California, Missouri, and New York, that one responsible for the condition of premises is not bound to foresee that an adult of ordinary intelligence would unauthorizedly remove the explosives, and so is not responsible for results.

The dissenting judge, Judge Murrah, thought that an award of damages would be proper, on the theory that the Government's negligence in permitting the unexploded shells to remain exposed on the premises was a more direct and culpable cause of the accident than the act of the father, who was not a tresapsser on the premises.

Unregistered Engineer Loses His Suit for Pay

THE PROBLEM: *An unregistered engineer was employed by a general contractor in Texas to serve as consulting engineer in the erection of a school-district stadium. He supervised engineering work and checked accounts and records pertaining to the job, etc. (1) Could he maintain suit to collect pay for his services, on showing that some of the services rendered did not constitute "engineering" within the meaning of a Texas statute requiring engineers to be registered? (2) Did the fact that a registered engineer and architect was in charge of the work on behalf of the school district bring the unregistered engineer within a provision of the statute exempting from registration subordinates of a registered engineer who did not have "responsible charge of design or supervision"?*

THE ANSWERS: (1) No. (2) No. (Gray v. Blau, 223 S. W. 2d 53, decided by the Texas Court of Civil Appeals, Beaumont.)

1. The court said that, assuming that some of the plaintiff's services were managerial, his contract called for engineering services too, and the evidence showed that he had performed them. Since he proved no basis for apportioning his compensation for services that he could perform legally without being registered as an engineer, his suit must fail.

2. The court said the plaintiff could not be regarded as a subordinate of the school district's supervising engineer within the exempting provision of the statute mentioned. "A supervising engineer employed by a general contractor owes his duty to his employer, the contractor." It is his duty to supervise the work and materials used so that they will "meet the approval of the supervising architect" and thus enable the contractor "to complete his contract to the satisfaction of the architect. The duties of the two are separate."

Corporate Officers — What Of Power to Change Work?

THE PROBLEM: *A Quonset construction contract called for a cinder-block foundation. The foundation construction was monolithic slab, which the owner, a corporation, claimed was not discovered until after the contract price was paid. The owner sued for damages. Did the trial judge err in refusing to permit the contractor to prove that a vice president of the owner agreed to the change?*

THE ANSWER: Yes. (Van Dusen Aircraft Supplies v. Terminal Construction Corp., 70 Atl. 2d 65, decided by the New Jersey Supreme Court.)

The trial court having awarded judgement in favor of the owner, the Supreme Court set it aside and ordered a new trial at which the contractor might prove that the owner corporation either authorized or ratified what the vice president did. The higher court said that the case was governed by these fixed rules of law:

The owner may waive the benefit of provisions of a construction contract, and thereby lose right to complain afterward because they were not carried out.

The waiver may result from oral agreement between the parties, even though the principal contract is in writing.

Where the owner accepts and pays for a job, failure for a considerable time—four months in this case—to complain that there was a breach of contract is a circumstance tending to support the contractor's claim that there was a waiver.

Neither a vice president nor other officer of a corporation—merely because he is such—has any power to alter the terms of a contract entered into by his corporation. "Such power must be conferred on him by the charter or by-laws, or by corporate action of its directors or stockholders, or be within apparent powers which the corporation has caused those with whom its officers have dealt to believe it has conferred upon him."

Although the original contract was signed by another vice president, the vice president who agreed to the change was manager of the corporation for the area where the work was done.

The authority of one to act as agent for

(*Concluded on next page*)

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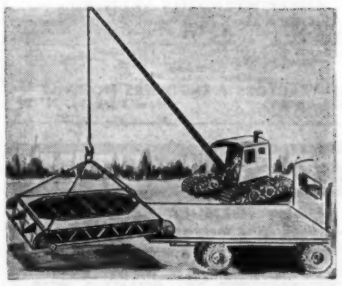

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Avoid Legal Pitfalls

(*Continued from preceding page*)

another cannot be proved by his own statement that he is an agent. But the contractor was entitled to prove the vice president's authority by showing what he said and did under circumstances indicating that the corporation had caused the contractor to believe that he had power to say and do what he did say and do. For example, the fact that the vice president visited the job while it was in progress was one material circumstance.

An Employee or a Partner?

THE PROBLEM: *A contracting firm agreed to pay a construction engineer an annual salary of one-sixth of the firm's net profits for the year during which he agreed to devote his time and attention to the firm's business as engineer and draftsman, and to attend the letting of contracts when necessary. Did the agreement constitute him an employee or a partner?*

THE ANSWER: An employee. (Porter v. Curtis, 96 Iowa. 531, 65 N. W. 824, decided by the Iowa Supreme Court.)

Although this decision was rendered in 1896, it reflects the general, if not uniform, present attitude of the courts toward such contracts.

When the engineer sued for compensation under the agreement, the defendant firm contended that the contract made him a partner, and since the business was operated at a loss during the year involved, there was nothing coming to him. Rejecting that argument, the court declared it was a well settled law that " a mere participation in the profits of a business does not constitute a partnership".

A three-to-two decision by the Michigan Supreme Court in the case of Canton Bridge Co. v. City of Eaton Rapids, 107 Mich. 613, 65 N. W. 761 (1895), is one of the most extreme rendered in a case of this kind. In that case, one Wheaton was designated as agent for the bridge company—evidently to secure contracts for it. He was to be paid one-half of the net profits, but was to be charged with half of the losses. Wheaton's contract designated him as agent, and his compensation as pay for services. The majority of the court ruled that this outweighed the fact that he was to be charged with losses—a circumstance which many courts have declared to be an indication of intent to form a partnership. The court said: "Ordinarily, an agreement to put service against capital, and share the profits and losses, will warrant the inference of a partnership; but such does not absolutely constitute a partnership . . . where other circumstances show that no partnership was created or intended."

The two dissenting judges agreed that a partnership was not indicated by the mere fact that Wheaton was to be paid a share of the profits as compensation. But they thought that all the circumstances, particularly the fact that he was to share losses, indicated a partnership. Few courts would disagree with the dissenting judges' statement: "The fact that he is designated as 'agent' in the contract, and that the writing refers to his profits as 'pay', cannot affect the result, if, by the plain provision of the contract, he is constituted a partner."

City Pays Up Prematurely

THE PROBLEM: *A Texas statute requires that public contractors give bonds to pay labor and material claims filed within 90 days after the labor and material are furnished. It requires the public body "after completion and acceptance of the completed project" to hold "all moneys due contractor" until it is shown that all just claims have been paid.*

A contract for street work provided for progress payments not exceeding 90 per cent of the contract price, but they were not made since the job was quickly finished. On completion and acceptance of the work, and before the 90-day limit for filing labor and material claims expired, the city paid the full contract price. The contractor became insolvent and his surety had to pay two materialmen who filed their claims within the statutory time. Could the surety require the city to reimburse it for the amount so paid?

THE ANSWER: Yes. (City of Orange, appellant, v. Fidelity Deposit Co. of Maryland, appellee, 180 Fed. 2d 369, decided by the United States Court of Appeals, Fifth Circuit.)

The Court of Appeals decided: The provisions of the statute govern all work contracts awarded by the state, its counties, and other subdivisions, whether specifically mentioned in the contract or not and despite any contrary clauses in the agreement. But the statute does not prevent the making of progress payments. It merely deals with such sum as may be due the contractor when the job has been completed. The fact that the contractor could have insisted on progress payments made no difference. The statute "nailed down" whatever was due him when the job was complete, including what was not paid during progress.

These are hot-oil road patchers recently put into service by the Los Angeles County Road Department. The specially designed flat-bed bodies are mounted on Mack Model LFSW 6-wheel chassis. Behind each cab is a 385-gallon oil storage tank which also heats the oil by coils, using the exhaust gas from the motor. The treated oil is pumped from the tank to a service outlet in the right side of the truck at the rear. Special boxes carry all tools. All special equipment was made by the Blackman Mfg. Co., Los Nietos, Calif.

Flood Damage Repaired, Extra Allowance Denied

THE PROBLEM: *A Federal dam construction contract stated that the Contracting Officer's decision should be final on all questions arising under the contract. After the contractors had excavated for the impervious section of the dam, but before the upstream cofferdam had been completed, a flood washed material into the excavated area. The contract required the contractor to restore at unit prices flood damage to "permanent work within the cofferdam". Was the Contracting Officer's ruling that the contractors were not entitled to the cost of removing the material binding upon the contractors?*

THE ANSWER: Yes. (Newhall-Herkner Construction Co. v. United States, 89 Fed. Supp. 321, decided by the United States Court of Claims.)

The contractors unsuccessfully argued that the foundation of the dam was a part of the "permanent work within the cofferdam". The court said it was doubtful that permanent work had been completed, but that in any event the Contracting Officer's ruling, not being unreasonable or arbitrary, was binding under the power given him to settle disputes.

Bid Withdrawn Rightfully

THE PROBLEM: *Could a bidder on a Connecticut state highway job have withdrawn his proposal before its acceptance?*

THE ANSWER: Yes. (State v. Hartford Accident & Indemnity Co., 70 Atl. 2d 109, decided by the Connecticut Supreme Court of Errors.) In the particular case, the rule was not directly involved, because the bid was accepted without any attempt having been made to withdraw it.

The decision is in line with a fundamental rule of law to the effect that one offering to enter into a contract may withdraw it any time before its acceptance, unless the offeree, for a valid consideration, is given an option for a certain time to turn the offer into a binding contract.

The court ruled that because the State Highway Department had reserved the right to reject any and all bids, the bidders had the reciprocal right to withdraw before acceptance, whether or not the bid was based upon a mistake. The fact that the bidding specifications stated that a request to withdraw a bid must be made in writing before opening of the proposals did not limit the right to withdraw, "because before acceptance of the bid the requirement was no more binding upon the company than any other provision of the proposal".

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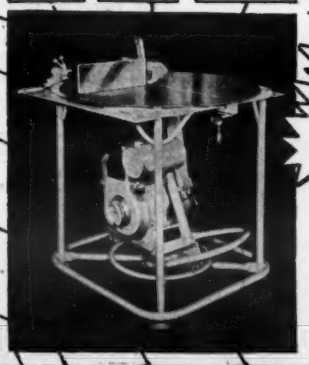
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American Manganese Steel Div. 73
American Steel Scraper Co. 71
Austin-Western Co. 6
Automatic Steel Products, Inc. 87

Baker-Roos, Inc. 32
Barber-Greene Co. 14
Bethlehem Steel Co. 56, 66
Bicknell Mfg. Co. 77
Bil-Jax, Inc. 84
Borden & Riley Paper Co., Inc. 48
Bucyrus-Erie Co. 49
Buffalo-Springfield Roller Co. 69

Case Co., J. I. 63
Caterpillar Tractor Co. 8, 9
Celotex Corp. 89
Central Construction Co. 101
Century Geophysical Corp. 44
C & H Electric Co. 85
Chevrolet Motor Div. 81
Chicago Pneumatic Tool Co. 87
Chrysler Corp., Industrial Engine Div. 29
Cleveland Trencher Co. 91
Coates Mfg. Co. 14
Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. 38
Coffing Hoist Co. 92
Complete Machinery & Equip. Co., Inc. 62
Concrete Transport Mixer Co., Inc. 39
Construction Machinery Companies 80
Contractors and Engineers Monthly 31
Cooper Co., John 26
Cummer & Son Co., F. D. 93

Dallett Co. 30
Danuser Machine Co. 78
Dart Mfg. Co. 90
Davenport Besler Corp. 16
Davey Compressor Co. 94
Dempster Brothers, Inc. 33
Detectron Co. 76
Detroit Diesel Engine Div., GMC 46
Dewey and Almy Chemical Co. 71
Diamond Chain Co., Inc. 26
Disston & Sons, Henry 45
Downs Crane & Hoist Co. 53
Drake-Williams-Mount 104
Duff-Norton Mfg. Co. 52
Duncan, K. O. 72

Eagle Iron Works 34
Economy Forms Corp. 69
Electric Tamper & Equipment Co. 64
Electroline Co. 67
Ellicott Machine Corp. 45
Embury Mfg. Co. 21
Euclid Road Machinery Co. 95

Fairfield Engineering Co. 99
Firestone Tire & Rubber Co. 39
Foote Co., Inc. 65
Foster Co., L. B. 76
Fuller Mfg. Co. 103

Galion Iron Works & Mfg. Co. 25
Gar-Bro Mfg. Co. 28
General Machine & Welding Works 84
General Tire & Rubber Co. 23
Gledhill Road Machinery Co. 101
GMC Truck & Coach Div. 60, 61
Goldak Co. 6
Goodall Rubber Co., Inc. 88
Goodyear Tire & Rubber Co. 5
Grace Mfg. Co., W. E. 86
Griffin Wellpoint Corp. 91
Gulf Oil Corp. 53
Gunderson-Taylor Machinery Co. 89
Gurley, W. & L. E. 75

Harnischfeger Corp. 57
Hayward Co. 7
Heltzel Steel Form & Iron Co. 62
Hendrix Mfg. Co., Inc. 37
Hopkins' Volcanic Specialties, Inc. 70
Hough Co., Frank G. 67
Hyatt Bearings Div., GMC 48
Hydroban, Inc. 98

Ingersoll Steel Div. 34
Institute of Applied Arts & Sciences of the State University of N. Y. 99
International Harvester Co. 54, 55
Iowa Mfg. Co. 96, 97
Ives & Sons, H. M. 102

Jaeger Machine Co. 50
Jahn Trailer Div., Pressed Steel Car Co., Inc. 102
Joy Mfg. Co. 10

Kato Engineering Co. 36
Kay-Brunner Steel Products, Inc. 70
Koehring Co. 42, 43
Kohler Co. 99

Laclede Steel Co. 84
LaCrosse Trailer Corp. 85
Lansing Co. 33
LaPlant-Choate Mfg. Co., Inc. 79
Leschen & Sons Rope Co., A. 47
Le Tourneau Inc., R. G. 108
Lima Shovel and Crane Div. 77
Link-Belt Co. 100
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Lubriplate Div., Fiske Bros. Refining Co. 88
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Maginniss Power Tool Co. 37
Marlow Pumps 44
Marmon-Herrington Co., Inc. 17
Master Vibrator Co. 11
McCaffrey-Ruddock Tagline Corp. 24
McCulloch Motors Corp. 27
McKiernan-Terry Corp. 83
McKissick Products Corp. 28
Messenger, Frank D. 103
Minneapolis-Moline 98
Miracle Decal Co. 107
Monarch Road Machinery Co. 103
Monsen-Chicago, Inc. 35
Morse-Starrett Products Co. 20

Naylor Pipe Co. 32

Oliver Corp. 51
Owen Bucket Co. 24

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Phoenix Products Co. 28
Punch-Lok Co. 46

Quinn Wire & Iron Works 26

Raytheon Mfg. Co. 80
Republic Steel Corp. 7
Rice Pump & Machine Co. 99
Richmond Screw Anchor Co., Inc. 78
Rockford Clutch Div. 52
Roeth Vibrator Co. 88
Rogers Brothers Corp. 92
Rogers Iron Works Co. 73
Rosco Mfg. Co. 57
R. P. B. Corp. 35

Saginaw Bearing Co. 104
Sasgen Derrick Co. 49
Shunk Mfg. Co. 63
Sinclair Refining Co. 18, 19
Slope Meter Co. 105
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Stratex Instrument Co. 103
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Thew Shovel Co. 16
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Unit Crane & Shovel Corp. 91
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Vacuum Concrete, Inc. 65
Van Dorn Electric Tool Co. 77
Viber Co. 20
Vibro-Plus Products, Inc. 105
Vulcan Iron Works 82
Vulcan Tool Mfg. Co. 51

Warren-Knight Co. 95
Warren Refining & Chemical Co. 76
Watts & Co., Charles R. 56
Waukesha Motor Co. 86
Wellman Engineering Co. 58
White Mfg. Co. 66
Whitestown Trencher Co., Inc. 102
Wickwire Spencer Steel Div. The Colorado Fuel & Iron Corp. 38
Williams Form Engineering Corp. 75
Winslow Scale Co. 47
Wisconsin Motor Corp. 70
Wood Mfg. Co. 82, 93
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SNOW equipment that works year around

19 m.p.h. C TOURNADOZER doubles as snow plow, dozer

With regular 11'2" x 43" bulldozer mounted on his 180 h.p. C Tournadozer, Contractor A. W. Glenn of Salt Lake City, Utah, opens snow-blocked road between Newcastle and Modena. Rubber-tired Tournadozer left cleared pavement in A-1 condition . . . on other stretches, crawler rigs did damage to oiled and paved surfaces.

PLOWS WITH V-TYPE BLADE

When deep snow covered parts of Western Canada last winter, one Municipality equipped their Tournadozer with a LeTourneau 12'3" x 6½' V-plow. Temperatures reached 34° below zero . . . drifts were 3 to 8' deep, some solid ice . . . yet in 142 hours, Tournadozer cleared all 600 miles of roads and farm lanes in the area.

PUSHES, PULLS, LIFTS

Spring, summer, fall, Tournadozer has a wide range of uses. As a dozer, it handles road maintenance, push-loads scrapers, pulls equipment, etc. As a crane, it lifts 14 tons up to 12' . . . with 50,000 lb. winch, it's ideal for logging. Here, Ann Arbor Construction Co. uses a "C" to strip old blacktop from Rt. 112 for Michigan Hwy. Dept.

28 m.p.h. D TOURNAPULL works as one-man dirtmover

Chippewa County, Wisconsin, used three 122 h.p., 7-yd. D Tournapulls and two 93 h.p., 8-yd. crawler-scraper rigs on 100,000-yd. relocation of Highway M. Pusher-loaded, the 3 "D's" averaged 126 pay yds. hourly on typical 6400' cycles . . . in all, moved 75,000 cu. yds. as compared to 25,000 yds. for the crawlers.

HAS MULTIPLE CONSTRUCTION USES

Self-loading, electric-control "D" digs 1500-yd. stockpond dam in Edmunds County, S.D., for Contractor Roy Jones. Fast speeds on big low-pressure tires let rig drive over highways from job to job, complete dam a day. Other "D" uses: strip, stockpile gravel, grade airports; and with dozer blade, backfilling, light clearing, etc.

SETS FAST PACE ON SNOW-PLOWING

For winter work, regular dozer blade is interchangeable with 4'8" x 10'6" V-type snow plow. Other auxiliary hauled units—9-ton rear-dump hauler, 7-ton crane, 21' flatbed—assure you of steady earnings the year around! Get *all* the facts on versatile Tournadozers and Tournapulls from your LeTourneau Distributor TODAY!

TOURNADOZERS. . . TOURNAPULLS

R. G. LeTOURNEAU, Inc., PEORIA, ILLINOIS